AMERICA'S LARGEST TEXTILE MONTHLY

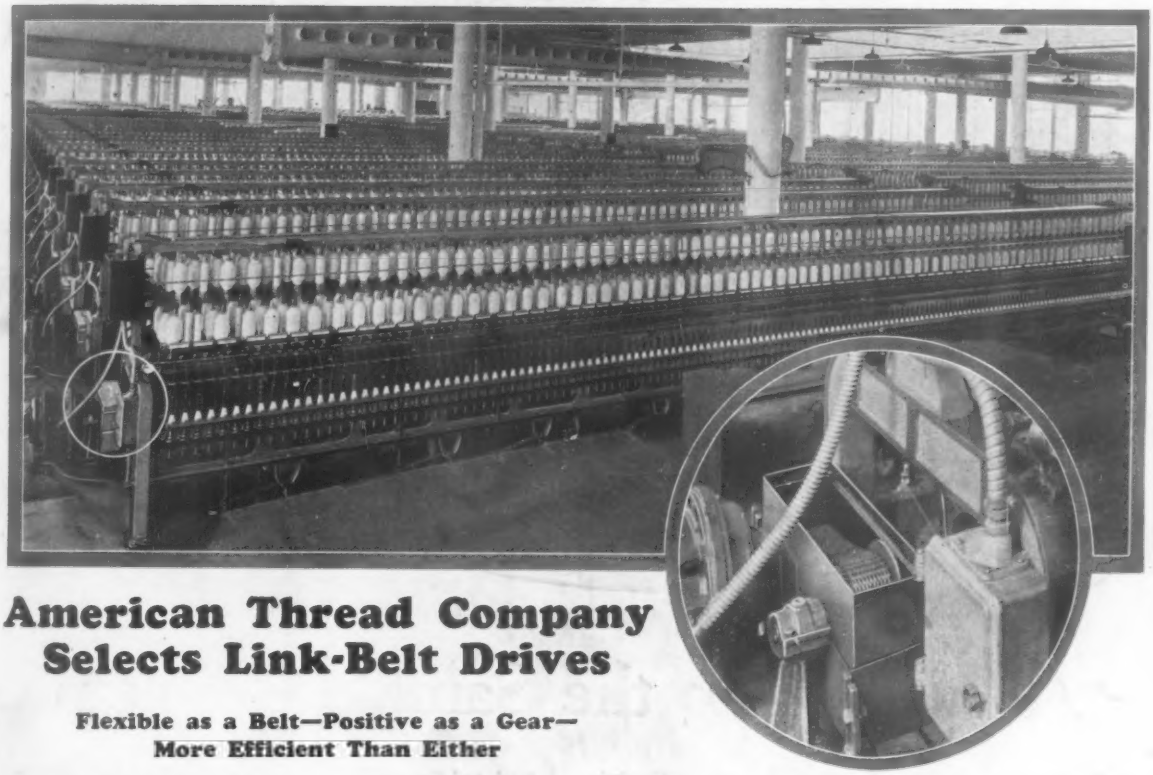
COTTON

Volume 89.
Number Twelve.
$1.00 a Year.

Entered as second-class matter at the postoffice, Dalton, Ga., under Act of March 3, 1879.

OCTOBER, 1925

Published monthly by
W. R. C. Smith Publishing Co.
Dalton and Atlanta, Ga.



American Thread Company Selects Link-Belt Drives

Flexible as a Belt—Positive as a Gear—More Efficient Than Either

ANOTHER testimonial to the effectiveness of Link-Belt Silent Chain Drives is the adoption of this 98.2% efficient (on actual test) power transmission by the American Thread Company for driving the Spinning Frames in their new Dalton, Ga., plant. A view of the spinning room is shown above. A typical drive is shown in the insert.

Selected because of their ability to transmit power at uniform, sustained speeds, without loss or slip, Link-Belt Silent Chain Drives help materially in maintaining the maximum production of the Spinning Frames and in producing a high grade, uniform product. These advantages and many others are fully explained in Book No. 765.

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LINK-BELT

SILENT CHAIN DRIVES

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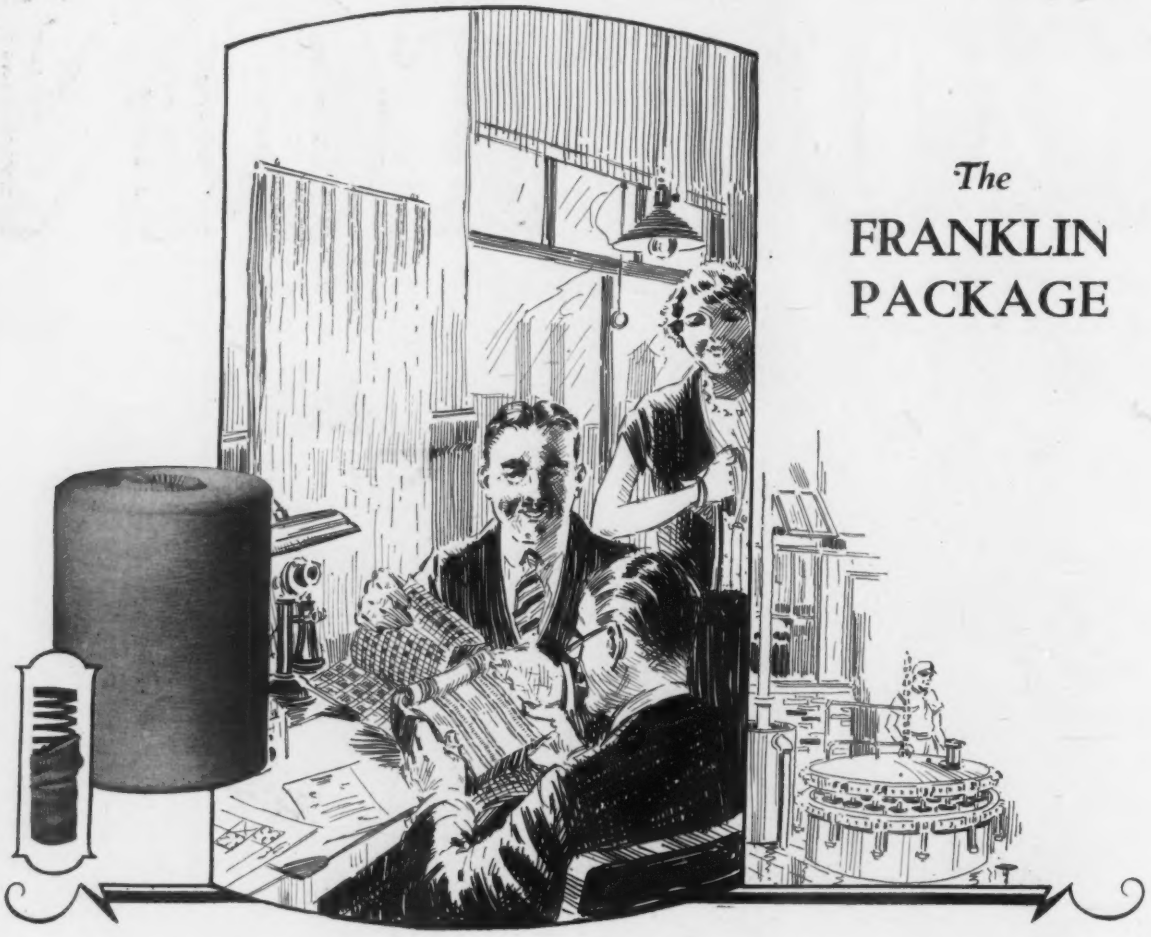

The
FRANKLIN PACKAGE

A Solution to the Sample Problem

THE making of sample pieces from yarn dyed by the chain warp method requires the splitting of a warp with a standard number of ends. More often than not, the odd ends of a split warp are sold as junk at a substantial loss. On the other hand, to split and dye a gray warp means about two weeks' delay in obtaining the sample piece.

Cotton weaving mills, having their yarns dyed by the Franklin Process Company, commission dyers, make it a practice to carry a stock of Franklin Packages in standard colors. When a sample piece of goods is desired, the required number of packages (ends) are taken from stock, placed in a creel, and the pattern warp made up in record time without waste. Any yarn left on the Franklin Packages can be rewound to full packages or spools at a nominal cost.

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If you are a mill executive and wish to know more about the Franklin Package and its possibilities, send for our new de luxe book, "The Franklin Process—Its Contribution to the Textile Industry."

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also Yarn Spinners, Manufacturers Glazed Yarns

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Greenville, S. C.

COMMISSION DYERS OF YARN IN THE WOUND FORM

COTTON

Published Monthly by

W. R. C. Smith Publishing Co , Dalton and Atlanta, Ga.

L. L. ARNOLD, Editor. R. W. PHILIP, Associate Editor.

Editorial and Advertising Department, Grant Building, Atlanta, Ga. Subscription price, $1.00 per year; Canada, $1.50 a year; Foreign, $2.00 a year. Entered at the Dalton, Ga., postoffice as second-class matter.

Contributions to the columns of Cotton are solicited and paid for after publication. The names of contributors need not necessarily be used, but must accompany all manuscripts.

Orders for any change in advertising must reach Atlanta previous to the tenth of the month preceding month of issue, otherwise publishers cannot be responsible for changes.

When changing address, notify us, not the postmaster. Always give the old address as well as the new one.

Volume 89 Member Associated Business Papers, Inc. Member Audit Bureau of Circulation. No. 12

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MATHIESON Chemicals

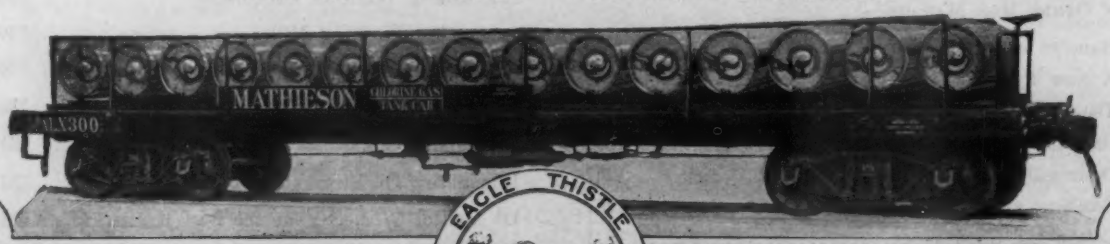
A New Protection for Mathieson Chlorine Containers

AS a result of exhaustive tests conducted at our Niagara Falls works, we have adopted aluminum paint as the best protection for the Chlorine containers of our Multi-Unit and Single-Unit tank cars.

Aluminum paint shows high resisting qualities against rust, weathering, fumes and gases, and gives better protection and longer service than ordinary paint. Its bright metallic surface adds greatly to the appearance of the equipment it covers and possesses the added advantage of reflecting most of the sun's heat to which containers may be exposed.

We believe Mathieson customers will appreciate this new feature because of its greater serviceability and as an indication of the pride we take in our Liquid Chlorine equipment.

The MATHIESON ALKALI WORKS *Inc.*
250 PARK AVE. , NEW YORK CITY
PHILADELPHIA CHICAGO PROVIDENCE CHARLOTTE



EAGLE THISTLE PRODUCTS

Deal Direct with the Manufacturer

Caustic Soda - Liquid Chlorine - Soda Ash - Bleaching Powder
Bicarbonate of Soda - Modified Virginia Soda
Anhydrous Ammonia - Aqua Ammonia

With the Publishers—

"Young Fogies" and the Idea Pipe Line

A successful advertising agency man once confessed to another that he had to resort to all sorts of mechanical tricks to stimulate his mind—to prime his mental carburetor, so to speak.

Textile men who hope that an idea will "come out of the blue" to make plant operation easier will be interested in his discovery, as told in Printers' Ink:

"In my younger days I used to suppose that when an idea wouldn't come naturally and easily I would just have to wait for it to come. But I've learned long since that businesses move too fast and days are much too short to wait for ideas."

You go stale waiting for ideas. Successful executives expose themselves to new ideas as often as possible. H. S. McCormack in listing the qualities of a real executive, stressed, "His experience has taught him that no one man can corner the whole brain market; consequently he is not above learning from others. He is not wedded to preconceived notions and is neither afraid of nor fascinated by new ideas."

Something of the same sort was expressed by Carroll Dean Murphy: "The thing that keeps a man young is the stream of new interests that tingles through him. Not only must he be a thinker but he must have sources of ideas outside of himself." He told of a man whose ability in his field had attracted attention. This man explained it. "I've made it a rule to know every man who has written my kind of stuff in a way that interests me. A man can't afford to neglect other men's ideas. It takes something more than haphazard reading and mixing to win in business today."

Is there any better way for textile men to prime their mental carburetors than with the monthly issues of COTTON? Here is an easy-flowing stream of ideas that have been filtered from the best in the field—high-test stuff. Knowing what the other men in the industry are doing stimulates them and keeps them from becoming what William James, the psychologist, called "young fogies."

Every textile man who gets COTTON has running into his office what Mr. Murphy calls an "idea pipe line." Through this pipe line powerful ideas concerning the most profitable machinery and materials to use in mills are sent by the manufacturers of equipment and supplies.

Both the editorial and advertising pages are built up with a view to stimulating the textile man who knows that "businesses move too fast to wait for ideas."

AMONG COTTON'S READERS

P. J. HINDS, Gen. Supt. Mfg.

THE AMERICAN THREAD COMPANY, Inc.

Willimantic Mills, Willimantic, Conn.
Merrick Mills. Holyoke, Mass.
Hadley Mills. Holyoke, Mass.
Wm. Clark Mills, Westerly, R. I.
Kerr Mills, Fall River, Mass.
American Thread Co, of Dalton, Ga.

"I have been a reader of COTTON for a great many years, and have encouraged the men in our organization to read your magazine, as it is very helpful in a great many ways."

P J Hinds

Standing out as a model of engineering and design, with up-to-date manufacturing equipment, and situated in an ideal location, the new spinning mill of the American Thread Company, at Dalton, Georgia, presents an interesting object for description. The plant is known as the American Thread Company of Georgia, and is a subsidiary of the American Thread Company, famous as spinners and manufacturers of cotton threads. It is the first plant of the company to be located in the South. The other mills are located as follows: Willimantic Mills, at Willimantic, Conn.; the Merrick Mills, at Holyoke, Mass.; the Hadley Mills, at Holyoke, Mass.; the William Clark Mills, at Westerly, R. I., and the Kerr Mills, at Fall River, Mass.

The Dalton plant contains 30,120 spinning spindles, and produces numbers ranging from 20s/2 to 40s/3. The present mill ships the yarns to the company's eastern finishing plants; 50 per cent going in skeins, 25 per cent in warps, and 25 per cent on cones. The first lot of cotton was started through in March of this year, with capacity production being attained about three months later.

From the standpoint of location, the Dalton mill is generally conceded by observers to be most ideally situated. The company, after thorough consideration of numerous locations when their plans for a southern branch materialized, selected a tract of 550 acres two miles south of Dalton, comprising the property of the Country Club, and the mill and village have been placed on the naturally attractive fairways of a golf course.

For the manufacturing building, which consists of one unit 128 x 531 feet, a commanding site was selected, and grading and landscape work effected to place the mill on the summit of an elevation overlooking an attractive village of 135 houses, built eastward and northward from the plant. The ensemble presents an alluring picture of natural location combined with engineering skill in the creation of a modern industrial community.

Lockwood, Greene & Company, of Boston and Atlanta, through the Atlanta office were engineers for the work, which was begun in 1923, and this organization joins with the American Thread Company in justifiable pride in the product.

F. Lee Gavitt, agent, American Thread Co. of Georgia.

Manufacturing operations are carried on in the main mill, which is a two-story reinforced concrete skeleton building with monitor, and concrete columns and concrete beams and girders. The dimensions of the building are 128 x 531 feet, and on the north end is a basement, 71½ x 125 feet, with granolithic floor, used as a machine shop and carpenter shop. The beams of the building are floored with four-inch plank, a one-inch intermediate floor, and a ⅞-inch maple top floor. The first floor, bearing on the ground, is a 4½-inch concrete slab with a 2-inch creosoted plank bedded into one inch of sand-tar rock upon which is laid the maple top flooring. "Creo-pine" sub-flooring was used. A concrete platform at the lower end of the mill is used for receiving and shipping materials on a side-track coming in from the main line of the Southern Railway which passes through Dalton. The roof of the mill building, in which Barrett Specification roofing was used, is constructed of three-inch plank, with tar and gravel topping.

At the rear of the main building, and connected with it by a two-story passageway and a bridge at the second story, is the picker building, 70 x 107 feet, which is two stories high, with a basement, the construction being similar to that of the main mill. This houses the ageing bins, pickers and yarn conditioning room, which will be discussed later.

A four-story slow-burning brick and timber structure, 74 x 74 feet 8 inches, located across the spur track at the lower end of the mill, is used as the cotton storehouse, having 5,000 bales capacity. It is equipped with elevator, automatic sprinklers and steam heat. On the first floor the opener department is located, the cotton going to the picker building through a conveyor pipe. The boiler house, constructed with a wood roof and steel trestles, is equipped with a horizontal return tubular boiler, which is used for heating purposes only, as all of the machinery is motor-driven, power being secured from the Georgia Railway and Power Company lines through a transformer. A. K. Adams & Co., Atlanta, Ga., were the contractors for the manufacturing buildings, as well as for the other concrete work done in the village.

In the location of the village, the company matched the opportunities afforded by the natural contour of the site with modern cottages for the operatives, there being 135 houses in number, constructed by the LaGrange (Ga.) Lumber & Supply Company. These are of late industrial design, and each house is located on a 150x 70 foot lot; and each is equipped with running water facilities, electric lights and water toilet. Each house in the village is equipped with a kitchen sink. A sanitary sewage system is installed in the village, and all the streets have concrete curbing and sidewalks. A spacious, well-arranged store building, and up-to-date seven-room school house, the latter being operated by the mill company for nine months' school each year, are included in the village.

Located on the mill property is a natural spring which furnishes an ample water supply. On the top of a hill near the plant, there is constructed a 300,000-gallon concrete reservoir, in two divisions. The upper division of 100,000 gallons is used for village and mill drinking and service purposes, while the lower 200,000 gallons is retained as a reserve supply for fire protection purposes.

Going into the mill itself, one interested in textile manufacturing methods finds much of a nature to attract his attention. That the company, in selecting materials and equipment, used their best judgment in providing the "last word" throughout, is at once evident. The photographs which accompany this description present clearly views which demonstrate the modernness, efficiency and attractiveness of the plant. A brief description of the processes will interest the student to whom advanced ideas of manufacture appeal.

Previous to this, however, a description will be given of the system of humidification, which is of a design entirely new to the South, in fact, the Dalton plant is the first cotton mill in America to be completely equipped with this system. This is the patented "Aerophor Mertz" system, installed by V. E. Mertz, 151 Fifth Avenue, New York City.

The principle is the use of a series of conical air distributing pipes or ducts suspended from the ceiling, as is clearly shown in the interior views included in the photograph lay-outs. The entrance end of these ducts is placed at windows, and by means of a damper regulatory device air may be taken either from outside or from inside of the building, as conditions seem to warrant, or a combination of the two may be secured. At the entrance end the duct is of a cylindrical shape for a number of feet and inside of this section is located the spray system for washing and conditioning the air. Here are located a series of spray heads. From this portion the duct becomes a cone, extending to the center of the room, and at intervals on either side of its surface are located collars or openings through which the air is expelled into the room. The conical shape of the duct, which reaches its smallest diameter at the end in the center of the room, is for the purpose of providing for the smaller volume of air consequent upon the discharge of air through the collars during its passage through the duct.

A pump and a reservoir, in the basement, are centrally connected with the distributing apparatus. The pump takes the water from a reservoir, puts it under pressure and delivers it to the spray system in the cylindrical part of the ducts. This sprayed water sucks the air from the entrance to the duct, washes it, and propels it into the room through the distributing collars. It is evident, therefore, that neither blowers nor fans are used in bringing the fresh air into the ducts, the only mechanism used being a pump for supplying the water. In this respect the system differs from the usual practice of humidification.

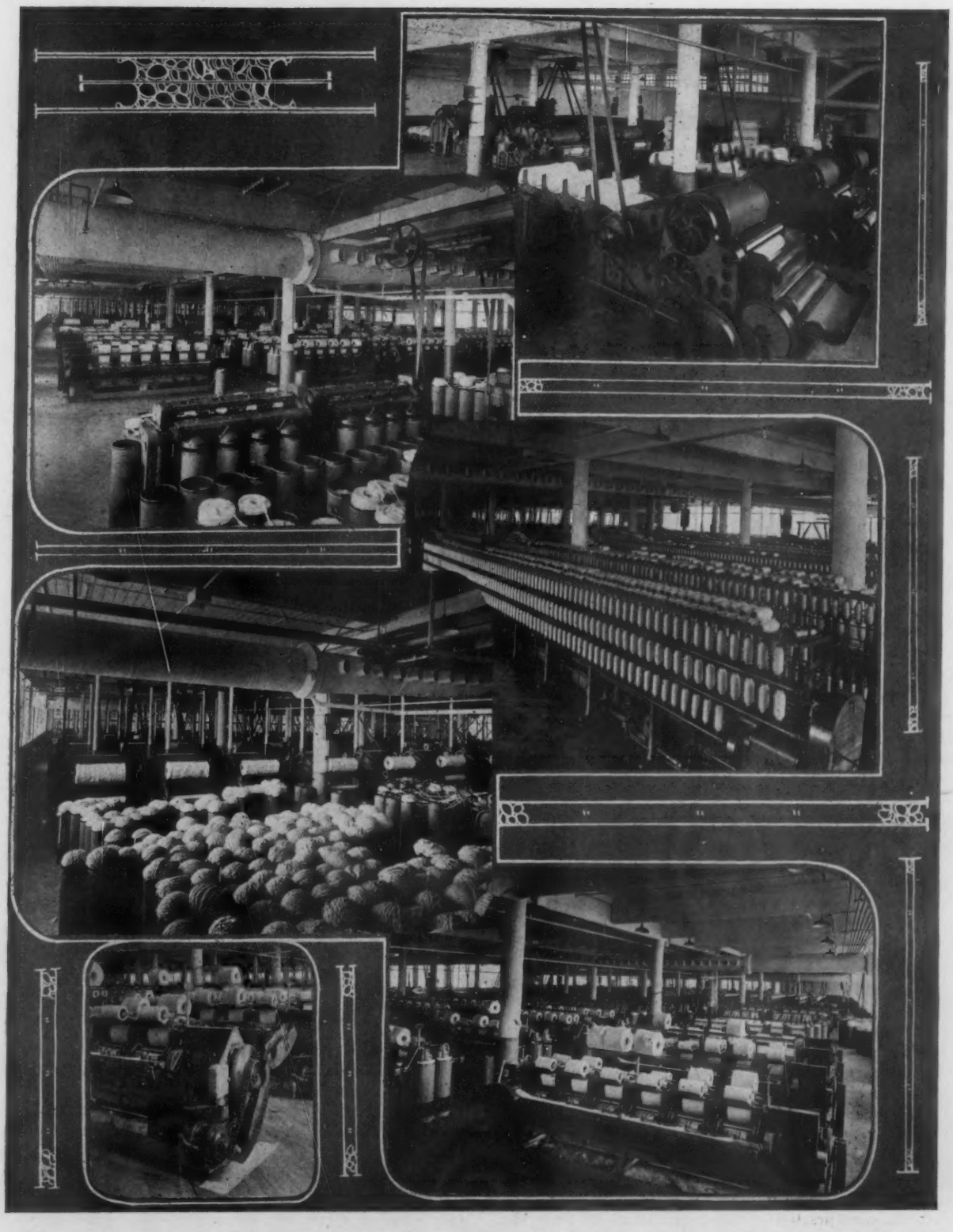
Going now briefly and generally into the manufacturing procedure, one notes with interest that all of the machinery, trucks, roving cans, etc., as well as sections of the walls and posts, are painted battle-ship gray, which harmonizes the general effect into a pleasing color scheme throughout the plant.

The cotton is opened on the bottom floor of the four-story cotton warehouse, and, from an H. & B. bale breaker, it is sucked into the picker building at the rear of the mill. Here it is received and distributed by Dobson & Barlow condensers, into four ageing or conditioning bins. There are two condensers, each feeding into two ageing bins or rooms.

These rooms are of sufficient size to permit the cotton to lie or condition for a considerable time before being processed, thus allowing the fibers to aerate into better condition. Picking equipment consists of two Dobson & Barlow, Buckley design, breaker pickers, and four finishers of the same make. The breakers are equipped with piano motion eveners, and have another special feature in that the hoppers include swinging aprons, which, being connected with the brake, automatically stop and start the machine when the amount of cotton in the hopper goes below or reaches the half-full level, the object being to keep the proper amount of cotton in the hopper at all times; this acting, in a manner, as an evener. These two breakers supply the four finishers, which also have a special evener motion. These pickers are driven by belt from a motor-driven main shaft.

In the picker room, special lap trucks furnished by Patten Brothers, Fall River, Mass., are used for transporting laps to the card room, and also, for storing in the case of a surplus from either breakers or finishers, eliminating the practice of storing surplus laps on end.

From the picker room the laps are trucked through a passageway into the carding department in the main mill, where there are 106 H. & B. cards, equipped with the Saco-Lowell card stripping device. The cards are group driven, General Electric motors being used, with Morse silent chain drive, operating groups of approximately 25 cards. The card sliver next goes to the sliver-lap and ribbon-lap machines, which are of John Hetherington & Sons Company make. Twenty-six Tunstall combers next receive the sliver, this being the first cotton mill in the United States to be completely equipped with this make of



Interior views on first floor of American Thread Co. of Georgia. Top picture shows picker room, equipped with Dobson & Barlow pickers. Next view is of drawing frames and combers. Center picture shows roving department, and the next is a section of the cards. A close-up of individual chain drive on combers, and a general view of combing department, are shown in the bottom pictures. Leaving the picker building, the stock follows a continuous passage through the processes on the first floor, which convert it into finished roving for the spinning frames on the second floor.

comber. The machine is of the double action type, being equivalent to 52 deliveries of the single-type machine. These machines are driven by individual motors, with Morse chain; and the sliver and ribbon lap machines also are individually driven.

The drawing is of H. & B. make, and there are 104 deliveries. The machine is equipped with the Erman clearer for the top rolls and a special clearer for the bottom rolls. The principle of this under-clearer is that, instead of having a stationary under-clearer that will collect fly and allow it to get between the rolls and into the product, this is a reciprocating clearer which has a backward and forward movement, with the surface of the clearer and against the rolls, and causing the fly to form a cot on the cloth. The clearer is on a swinging bracket so that it may be pushed down for cleaning.

In the roving department there are nine slubbers and 48 intermediate and speeder frames. These machines, which are of H. & B. make, have the new H. & B. skeleton roving frame creel, and, like the drawing, are equipped with Erman top clearers and the patented reciprocating under-clearer. There are 18 8x4 frames and 30 7x3½ machines. The roving equipment is group-driven.

Next the roving is taken upstairs to the spinning room, where there are found 102 H. & B. frames, each driven by an individual motor and comprising a total of 30,120 spinning spindles. There are 34 frames of 278 spindles, which are driven by motor through Link-Belt silent chains. The remainder of the frames have 300 spindles each, being driven by direct-connected motors. The former frames have 2-inch rings, and 1¾-inch rings are used on the 300-spindle machines.

There are a number of features in the spinning department which merit especial mention. The creels are of the skeleton type, all superfluous material being eleminated in their construction, and this, it is believed, is the first mill in the United States to be so equipped throughout the spinning. The ordinary creel, as it is known, with its flat boards, permits the accumulation of fly and dirt that is difficult to remove. The skeleton creels, however, afford cleanliness of machine and product, the dirt and fly collecting on the lower creel board from which it is easily cleaned by hand.

The Richards-Hinds tubular or hollow unweighted middle roll is used throughout in the spinning. The frames are equipped with a top clearer that is peculiar and interesting, inasmuch as while it is perfectly cylindrical and not of a varying diameter or of conical shape, it travels across the rolls due to the direction of the "pile" of the cloth used.

Contrary to the general trend of opinion in the South, band drive is used on the spinning frames. In this connection, the C. C. C. band-tying device, made by the Cook-Taylor Company, Fall River, Mass., is used, this applying the bands on the frames with a given number of pounds of pressure and resulting in a uniform tension, officials stating that a power saving of 15 per cent is effected.

The usual practice in individually-driven spinning rooms is to locate the motors in the same alley driving frames on both sides, where the machines are placed across the mill. At this plant, however, the motors are situated at different ends of the frame, the theory being to escape the enormous amount of heat set up by a long double row of motors.

From the spinning, the yarn is transferred into the conditioning room on the second story of the picker building, where it remains for from 24 to 48 hours. In this building also is found the testing equipment of the mill. These departments are separately humidified from the main system of the mill, local heads being used.

Leaving the conditioning room, the yarn goes direct to nine Model 60-G Universal winders for single winding; then to seven doublers, receiving a clearing action at each machine. The winders put the yarn on cones for the doublers, from which it is put on tubes, all twisting, which is the next operation, being done from tubes.

The latest model Whitin tape-driven twisters are used, with ring sizes varying from 2-inch to 3-inch. There are 74 twisters in the equipment, these being individually-motor driven.

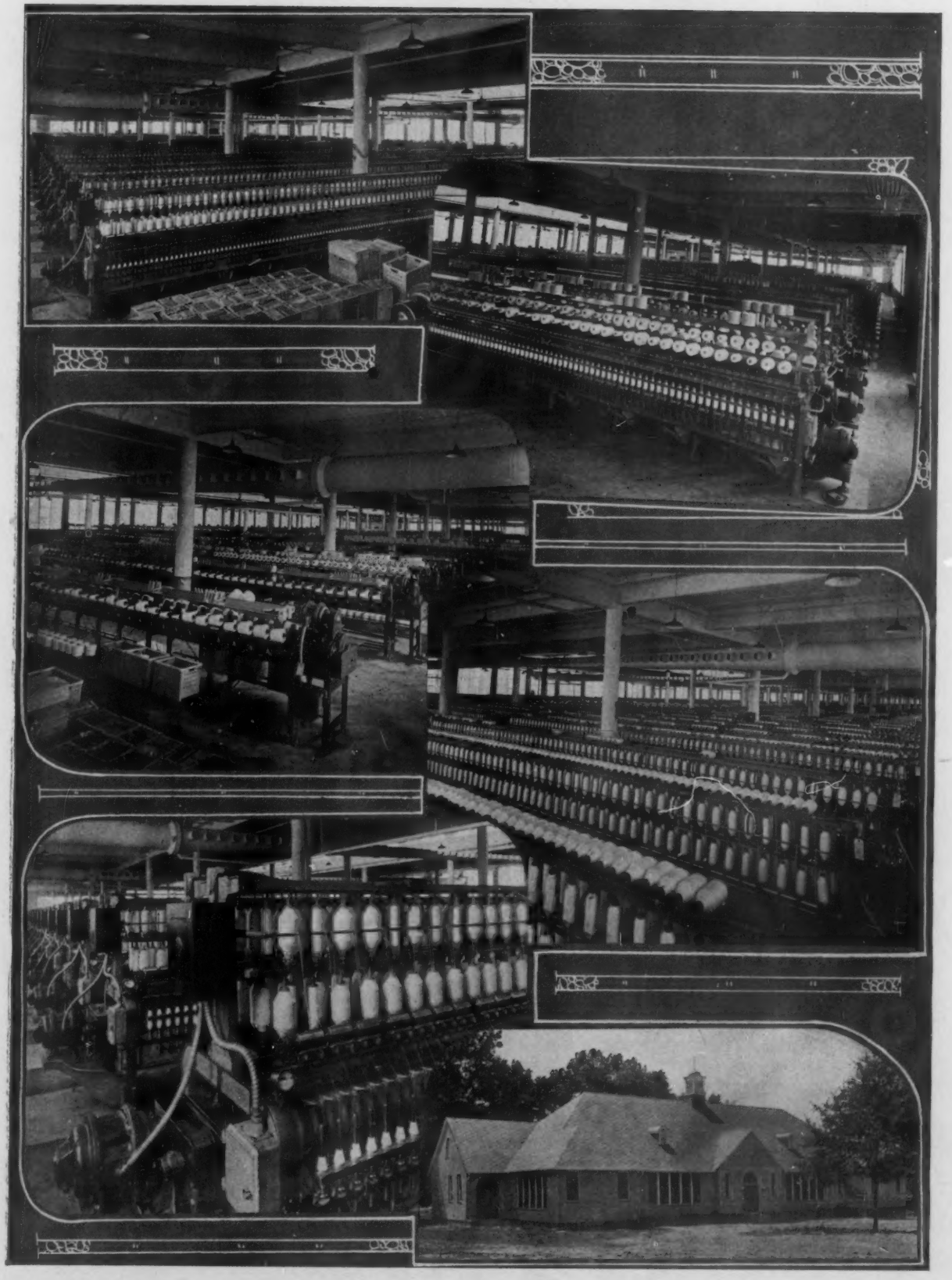
Model 50 Universal coning machines are the next process, the yarn being placed on wooden cones for warping, and on the usual containers for shipping as cones and for reeling into skeins.

The warping and shipping departments are located on the first floor adjoining the office space. Here are three warping machines consisting of the Universal creel and the new Entwistle head, the head being equipped with the traveling motor fan for cleaning. The wooden cones used for the creel in warping have a staple attached to the base, around which the end of yarn is placed when coning. In creeling, the operator fastens this end to the end of the cone next below in the creel, giving a continuous strand of yarn and making stoppages for creeling unnecessary during the running of the warp; as the yarn on one cone is exhausted the warper automatically begins on the next and so on.

General Electric Company, Schenectady, N. Y., furnished practically the entire equipment of motors for the plant. In the village the G-E "Novalux" street lighting fixture was used for illumination, in conjunction with whiteway posts supplied by the Withers Foundry & Machine Company of Atlanta, Ga. General Electric Company also supplied part of the underground cable, and the high tension switches for the power sub-station. The RLM type of reflector, secured from Benjamin Electric Company, was installed in connection with the lighting system for the mill. Other equipment for the power sub-station was supplied as follows: Insulators, Ohio Brass Company, Mansfield, Ohio; cable clamps, Electric Power & Equipment Company, Philadelphia; buss bars, American Brass Company; steel, F. E. Golian & Co., Atlanta, Ga.; underground cable, Standard Underground Cable Co., Perth Amboy, N. J., and American Steel & Wire Co., New York City. "Buckeye" conduits, from Youngstown Sheet & Tube Co., Youngstown, Ohio; "Economy" fuses; Trumbull safety switches; and Crouse-Hinds condulets, were used throughout in the electrical installation. J. M. Clayton & Co., Atlanta, Ga., were the electrical contractors.

In the boiler house, the brickwork was done by Brooks-Tisler Co., Atlanta, Ga. R. D. Cole Company, Newnan, Ga., furnished the boiler, and included in the equipment are a McBurney stoker, a soot blower and a Warren, Webster & Company feed water heater.

In the mill, the Grinnell Company furnished the vacuum system using Warren, Webster & Company specialties, and the piping for the mill, the sprinkler system, and the underground fire protection around the mill. The Blake-



General and close-up views of spinning, twisting and winding departments, and exterior of modern school building. Note the special system of rolls on spinning frames, which are driven by individual motors, as are the twisters and winders. Note the ducts of humidifier system.

Knowles horizontal single cylinder steam heating vacuum pump is used. In the schoolhouse, William A. Manning, of Atlanta, installed a Warren, Webster & Company gravity return system of heating, using the company's specialties.

Dodge Manufacturing Company, Mishawaka, Ind., supplied all transmission, shafting and pulleys for the mill. The Atlanta Sheet Metal Works, Atlanta, Ga., erected the conveyor pipe from the storehouse to the picker building. The Barrett roofing on the manufacturing building was laid by C. P. Murphy & Sons, Atlanta.

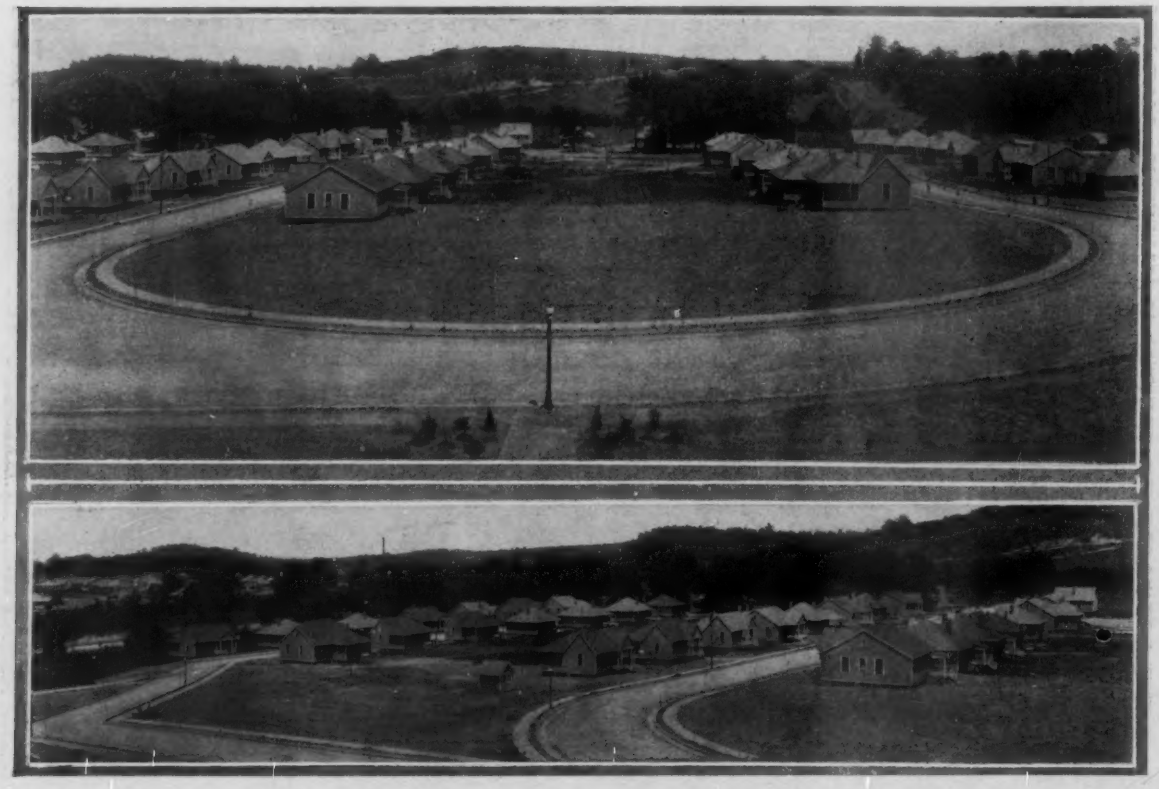
"Fenestra" steel sash was used throughout for the mill building, this being furnished by the Detroit Steel Products Company. Roving cans from the Standard Fibre Company, and trucks from the Fibre Specialty Company, Kennett Square, Pa., are used. The Rex Manufacturing Co., Dunkirk, N. Y., installed a waste baling press in the storehouse. A 12-desk interphone communicating telephone system is used in the mill, this being supplied by the Western Electric Company. S. F. Bowser & Co., Fort Wayne, Indiana, supplied an oil storage equipment.

Four scales—two stationary and two portable—were furnished by the Toledo Scale Company, and the American Kron Scale Company supplied two dormant platform scales. Four automatic fire doors for the cotton conditioning rooms were installed by Dowman-Dozier Mfg. Company, Atlanta, Ga. "Phenix" Portland cement was used on the mill buildings and in the village work.

Otis Elevator Company supplied three elevators—two in the main mill and one in the storehouse. "Puritan" drinking fountains, from the Halsey W. Taylor Company, Warren, Ohio, are in use in the mill.

"Genasco Latite" shingles were used on the village houses and the schoolhouse, these being furnished by the Barber Asphalt Company. The Southern Industrial Painting Company, Atlanta, did the painting for the mill and village, using "Veri-White" mill white, from Weaver & Co., Providence, R. I., on the mill building interiors, and their "Protex" brand for the village houses. "Creo-pine" subflooring was furnished by Southern Wood Preserving Co., Atlanta, Ga.

A 10-hp. Westinghouse motor is used on the service water pump at the reservoir. A Goulds Mfg. Company 3-stage 100-gallon pump is used for the village service water, and another of this make for the humidifier system. Two 1,000-gallon Allis-Chalmers fire pumps are used for fire protection.



Above—View of village in front of mill, showing roomy arrangement and streets and sidewalks. Below—another village view, looking northeast from mill, toward city. The village contains several miles of paved sidewalks and concrete curbing and gutters.

A. B. Bradfield, LaGrange, Ga., furnished the sanitary sewage system for the mill village as well as the water distribution. Landers Plumbing & Heating Co., Atlanta, Ga., did all the plumbing work for the mill and village. The plumbing fixtures were supplied by the Mott-Southern Company, Atlanta, Ga. Nichols Contracting Company did the grading.

The American Thread Company is composed of five directors: R. C. Kerr, president, and E. Martin Philippi, Charles E. Barlow, F. E. Kaley, and J. H. Crook, vice-presidents. J. G. Wylie is secretary and treasurer. P. J. Hinds, who is general superintendent of manufacturing for the company, has general supervision of the Dalton plant, which is under the direct charge of F. Lee Gavitt, agent. Before removing to Dalton, Mr. Gavitt was agent of the Glasgo (Conn.) plant of the company.

PLANT OF THE AMERICAN THREAD CO., DALTON, GA.

THE following companies whose advertisements appear in this issue furnished equipment or service for the new plant of the

AMERICAN THREAD COMPANY

of Dalton, Georgia—described on the preceding pages

Allis-Chalmers Mfg. Co.
Atkinson-Haserick & Co.
Benjamin Electric Mfg. Co.
J. M. Clayton Company
Cook-Taylor Company, Inc.
Dodge Mfg. Corporation.
General Electric Company
Georgia Railway & Power Co.
Goulds Mfg. Company
H. & B. American Machine Co.
Link-Belt Company
Morse Chain Company
Saco-Lowell Shops
Southern Wood Preserving Co.
Halsey W. Taylor Company
Toledo Scale Company
Universal Winding Company
Westinghouse Electric & Mfg. Co.
Whitin Machine Works
Youngstown Sheet & Tube Co.

H. & B. AMERICAN MACHINE CO.

Pawtucket, R. I.

Southern Office: 814-816 Atlanta Trust Co. Bldg., Atlanta, Ga.

MAKERS OF

COTTON MACHINERY

ESPECIALLY ADAPTED

FOR THE MANUFACTURE OF THREAD YARNS

The many complete installations furnished by us to the Leading Thread Mills in the world is a notable achievement of which we are justly proud.

The new American Thread Co. mill at Dalton, Georgia, is equipped with H & B Cards, Drawing Frames, Slubbing, Intermediate, Roving and Spinning Frames.

WE ALSO BUILD

EXHAUST OPENERS—HOPPER BALE OPENERS—CRIGHTON OPENERS
BUCKLEY OPENERS—SELF FEEDING OPENERS
FEEDERS—COTTON CONVEYING SYSTEMS—ROVING WASTE OPENERS
BREAKER—INTERMEDIATE and FINISHER LAPPERS

LEESONA
REG. U.S. PAT. OFF.

Universal Winding Equipment Throughout

THAT the American Thread Company should select Universal Equipment for its new Southern plant is natural in view of the acknowledged superiority of Universal Winding Machines, where scientific winding is demanded.

We, the engineers and artisans who made these machines, naturally take pride in the fact that Universal Equipment was selected. We appreciate the confidence placed in Universal Winding Equipment by the American Thread Company, and consider it a fitting testimonial to Leesona Quality and Service.

We take this means of extending to the American Thread Company congratulations on the attainment of another important step in their expansion—another proof of the success they so justly deserve.

Providence
New York
Chicago
Philadelphia
Charlotte
Utica

UNIVERSAL WINDING COMPANY
BOSTON

Montreal and Hamilton, Canada
Depots and Offices at Manchester and Paris

ATKINSON HASERICK & CO.

152 CONGRESS ST. BOSTON, MASS.

Cotton, Worsted and Rayon Machinery
And
Egyptian Cotton

Manufacturers of
The Tunstall Comber

Agents for:

DOBSON & BARLOW, Ltd.

Pickers, Cards, Drawing and Fly Frames
Rayon Machinery

PRINCE SMITH & SON

Worsted Machinery (Bradford System)

SOCIETE ALSACIENNE DE CONSTRUCTIONS MECANIQUES

Worsted Machinery (French System)

CARVER BROS. & CO., Ltd.

Egyptian Cotton

Card Clothing and Mill Supplies

JOHN VAN LANDINGHAM & SON

CHARLOTTE, N. C.

Southern Representative

TOLEDO SCALES

NO SPRINGS HONEST WEIGHT

The Ultimate Product of Scales

THE Toledo conception of an adequate industrial weighing service comprehends even more than a reliable device with which materials are measured simply by placing the load on the platform and reading the weight or count in plain figures on a dial from five to seven feet in circumference.

We realize that a scale is subjected to more exacting requirements than any other device used in business. It must measure accurately the very power that operates it, which is the weight of your goods.

Our responsibility, therefore, is to deliver to the user not only a properly designed, well engineered, and ruggedly built scale, but also the ultimate product of the scale, which is the continuously accurate automatic measurement of your materials.

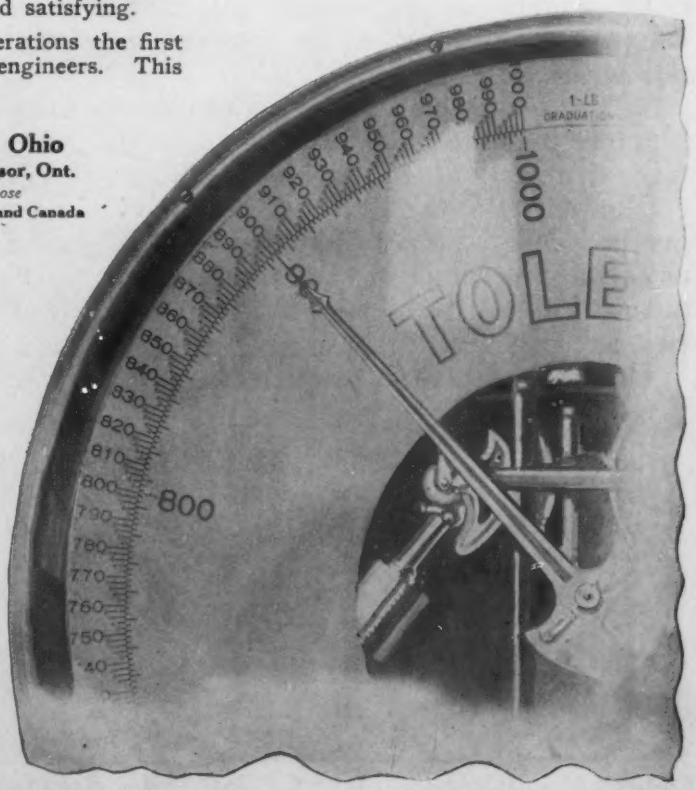
Further to insure this, the Toledo Scale Company provides facilities for scale maintenance never before equalled, through a permanent organization of skilled and accredited scale mechanics in 106 cities in the United States and Canada.

On agreement with the user his entire scale equipment is given systematic and periodic inspection. Thousands of manufacturers and merchants have entered into this agreement with us. It is simple, economical, and satisfying.

To modernize YOUR measurement operations the first step is an investigation by Toledo Scale engineers. This costs you nothing; it may save you much.

Toledo Scale Company, Toledo, Ohio
Canadian Toledo Scale Co., Limited, Windsor, Ont.
Manufacturers of Automatic Scales for Every Purpose
Service Stations in 106 Cities in the United States and Canada

Toledo Scales are used for automatic weighing, computing, counting, mailing, checking, packing, shipping and special purposes in stores, offices, shipping rooms, factories, mills and warehouses. Scales to weigh everything from an ounce of spice to thirty tons of steel.



Dodge Equipment Transmits Maximum Power at Low Cost

FROM the source of power to the place of application Dodge transmitting units insure maximum return for your power dollar.

In the American Thread Company plant as in hundreds of leading textile mills throughout the country Dodge equipment is looked upon as effective protection against power losses, as well as certain insurance against interrupted production and excessive upkeep expense.

Dodge is more than a source of supply —it is a specialized engineering organization on which you can depend for an unbiased analysis of your power layout. Whether equipping a new plant or rearranging your present facilities you should avail yourself of the forty-five years specialized experience which forms the background of this leader in its field.

Fourteen branch offices and five hundred local dealers bring Dodge service and Dodge products within reach of your telephone.

American Thread Co. Plant, Dalton, Ga.

DODGE MANUFACTURING CORPORATION, Mishawaka, Indiana

Branches: New York Minneapolis Boston Seattle Chicago Atlanta Pittsburgh Houston Newark San Francisco Philadelphia St. Louis Cincinnati Portland Oneida

DODGE

POWER TRANSMITTING - ELEVATING & CONVEYING - SPECIAL EQUIPMENT

The First Thing on the Job—

and the Last!

Creo-pine Sub-flooring

and Timbers

The picture above shows Creo-pine sub-flooring on the job, ready to be installed in the American Thread Company's new plant at Dalton, Georgia. (Lockwood, Greene & Co., Engineers.)

In practically all new cotton mill construction, Creo-pine sub-flooring is a standard specification. The universal use of Creo-pine has been brought about by these facts:

Creo-pine successfully withstands the ravages of dry-rot, which quickly destroys unprotected sub-flooring.

Creo-pine sub-flooring, installed once, eliminates floor troubles for all times.

Creo-pine has solved the most perplexing problem in cotton mill construction—rotting, sagging floors.

Your architect or engineer has used Creo-pine. Ask his advice about its economy, either for new construction or replacement.

Cross Section of Creo-pine Sub-Flooring

Creo-pine sub-flooring is carefully milled from selected, sound, felled-alive, air seasoned yellow pine, free from defects. It is treated by the S. W. P. vacuum pressure process which first draws out all of the sap and then forces the creosote oil deep into the pores of the wood under tremendous pressure. The result is a sub-flooring impervious to fungi and dry rot. A sub-flooring that will outlast the building. That will never need replacing.

SOUTHERN WOOD PRESERVING CO.

ATLANTA, GA.

Treating Plants EAST POINT, GA., *and* CHATTANOOGA, TENN.

Sales Offices:

NEW YORK · PHILADELPHIA · PITTSBURG · BUFFALO
CLEVELAND · CHICAGO · TOLEDO · CHARLOTTE, N.C.

Spinning Mill—American Thread Company, Dalton, Ga.

AN evidence of the high type of engineering exemplified in this fine new plant of The American Thread Company, at Dalton, Ga., is the exclusive use in it of

Buckeye Conduit

which was employed at all points where a rigid conduit could be used to advantage. A considerable quantity of REALFLEX ARMORED CABLE was also used, this being installed at points where its extreme flexibility and thorough dependability recommend it.

Neither The American Thread Company, owners, or Lockwood, Greene & Company, engineers who designed the installation, need give further thought to the electrical wiring, although this is a most important feature of such a plant. "Buckeye" and "Realflex" installed by J. M. Clayton Company, Atlanta, will render satisfactory service during the lifetime of the mill. Both are "Youngstown" products and neither has a superior for the purpose for which it was designed.

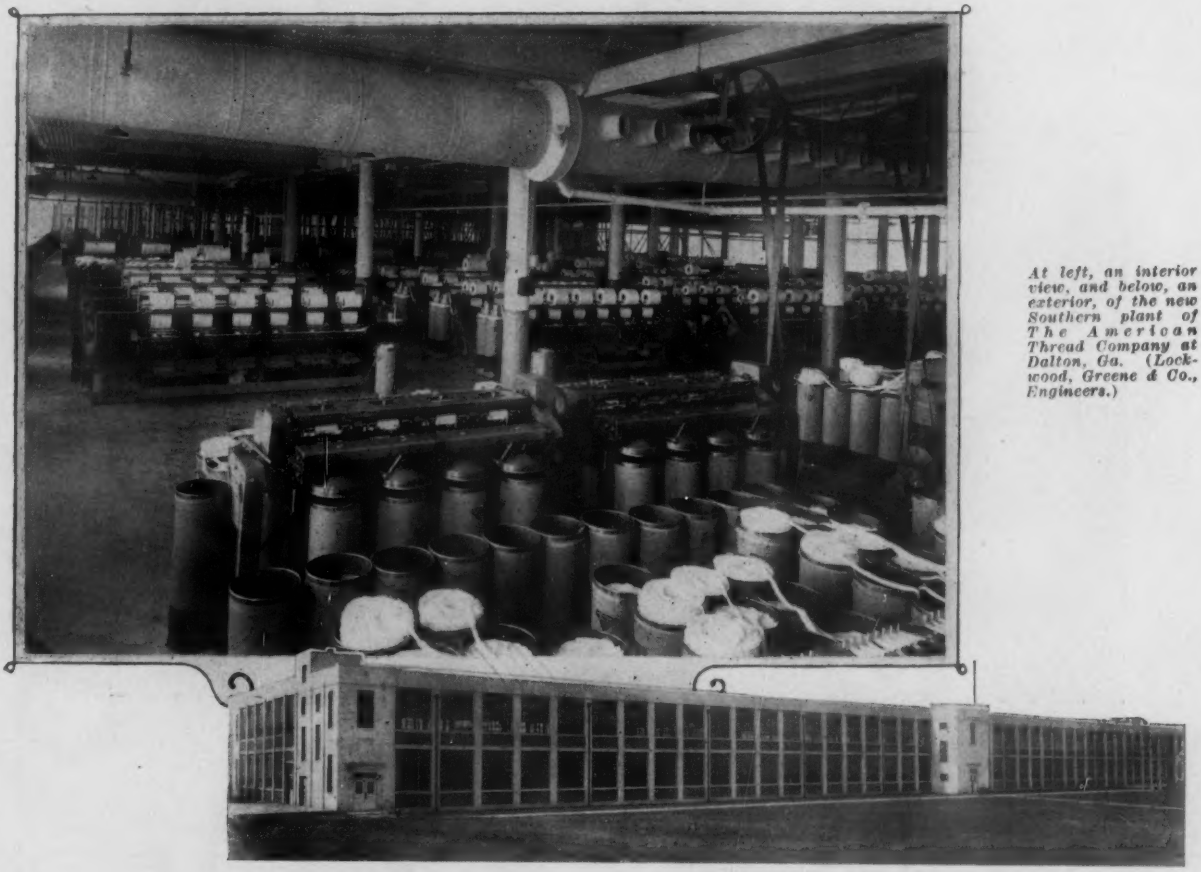
THE YOUNGSTOWN SHEET & TUBE COMPANY

YOUNGSTOWN, OHIO

DISTRICT SALES OFFICES:

NEW YORK—30 Church St., Hudson Terminal Bldg.
BOSTON—Massachusetts Trust Bldg.
PHILADELPHIA—Franklin Trust Bldg.
ATLANTA—Healey Bldg.
PITTSBURGH—Oliver Bldg.
CLEVELAND—Union Trust Bldg.
DETROIT—First Nat'l Bank Bldg.
CINCINNATI—Union Trust Bldg.
CHICAGO—Conway Bldg.
ST. LOUIS—Mo. State Life Bldg.
DENVER—First Nat'l Bank Bldg.
DALLAS—Magnolia Bldg.
SAN FRANCISCO—Sharon Building
SEATTLE—Central Bldg.
KANSAS CITY, MO.—Commerce Bldg.
MINNEAPOLIS—Andrus Bldg.
NEW ORLEANS—Audubon Bldg.

The American Thread Company's first Southern plant, at Dalton



At left, an interior view, and below, an exterior, of the new Southern plant of The American Thread Company at Dalton, Ga. (Lockwood, Greene & Co., Engineers.)

. . . chooses "the standard of the industry" in drinking fountains!

In addition to this latest plant, The American Thread Co. has three plants in New England and a total now of 570,000 spindles. Thus their importance in the industry can be readily appreciated. This fine new Georgia plant is a valuable contribution to the textile progress of the South, one of the most modern in the entire country.

Needless to say nothing was chosen haphazard in the way of equipment. Only after most careful and thorough study was the selection made. It is significant, therefore, that Halsey Taylor Drinking Fountains were chosen. Once again they have proved "the standard of the industry" measuring up to all known standards hygienically and architecturally.

Only Halsey Taylor Drinking Fountains have automatic stream control and two-stream projector, with permanent and positive assurance of sanitation! Investigate—write for catalog.

HALSEY TAYLOR
DRINKING FOUNTAINS

—Why They Are Most Sanitary—

A—Uniform height of stream regardless of pressure due to *automatic stream control.*
B—Converging stream forms ideal drinking mound avoiding contamination, because it is impractical for lips to touch projector.
C—Double outlet causes converging stream, forming ideal drinking mound at apex of stream.

—another Clayton installation!

Aeroplane View—The American Thread Company of Georgia
Lockwood, Greene & Co., Engineers.

1154 Lighting Units
297 Motors
2212 Horsepower Connected
2000 KVA Outdoor Transformer Station

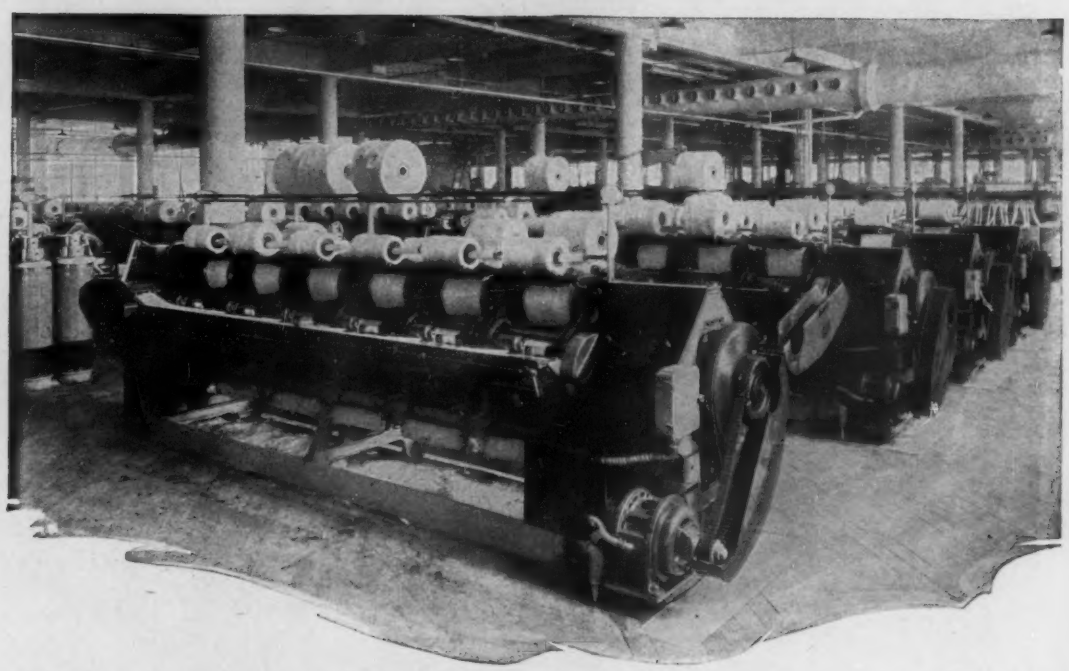
Experience—Craftmanship— Responsibility

J. M. CLAYTON COMPANY

CONTRACTING ELECTRICAL ENGINEERS
ATLANTA, GEORGIA

MORSE SILENT CHAIN DRIVES

THE MORSE "ROCKER JOINT"



Card Room of the American Thread Company, Dalton, Ga., where Morse Silent Chain Drives are used for all group drives and for individual comber drives.

Transmitting Power with 98.6% Efficiency at the American Thread Co.'s New Plant!

Morse Silent Chains are used for all group drives in this new plant of the American Thread Company, for only the highest quality equipment throughout the plant was selected. Throughout the textile industry Morse Silent Chain Drives are recognized as vitally important to any mill striving to attain and maintain leadership in volume of production and quality of product.

Morse Silent Chain Drives transmit 98.6% of the power developed by the motor. They cannot slip, nor do they involve any of the delays due to stitching, lacing, tightening, breakdowns or failures in service experienced with other forms of drives. Nor does fly and dirt from pulleys and belts injure the quality of the product. Moreover, being flexible as a belt, they absorb the shocks and jars of starting and stopping, protecting motor armatures and lessening journal friction.

The Morse Rocker Joint substitutes rolling motion for sliding motion of the joint, which reduces wear and insures extremely long life of the drive without repairs and breakdowns.

Applicable to long or short centers, one quarter to 5,000 H.P., and speeds from 6,000 to 250 R.P.M. or less.

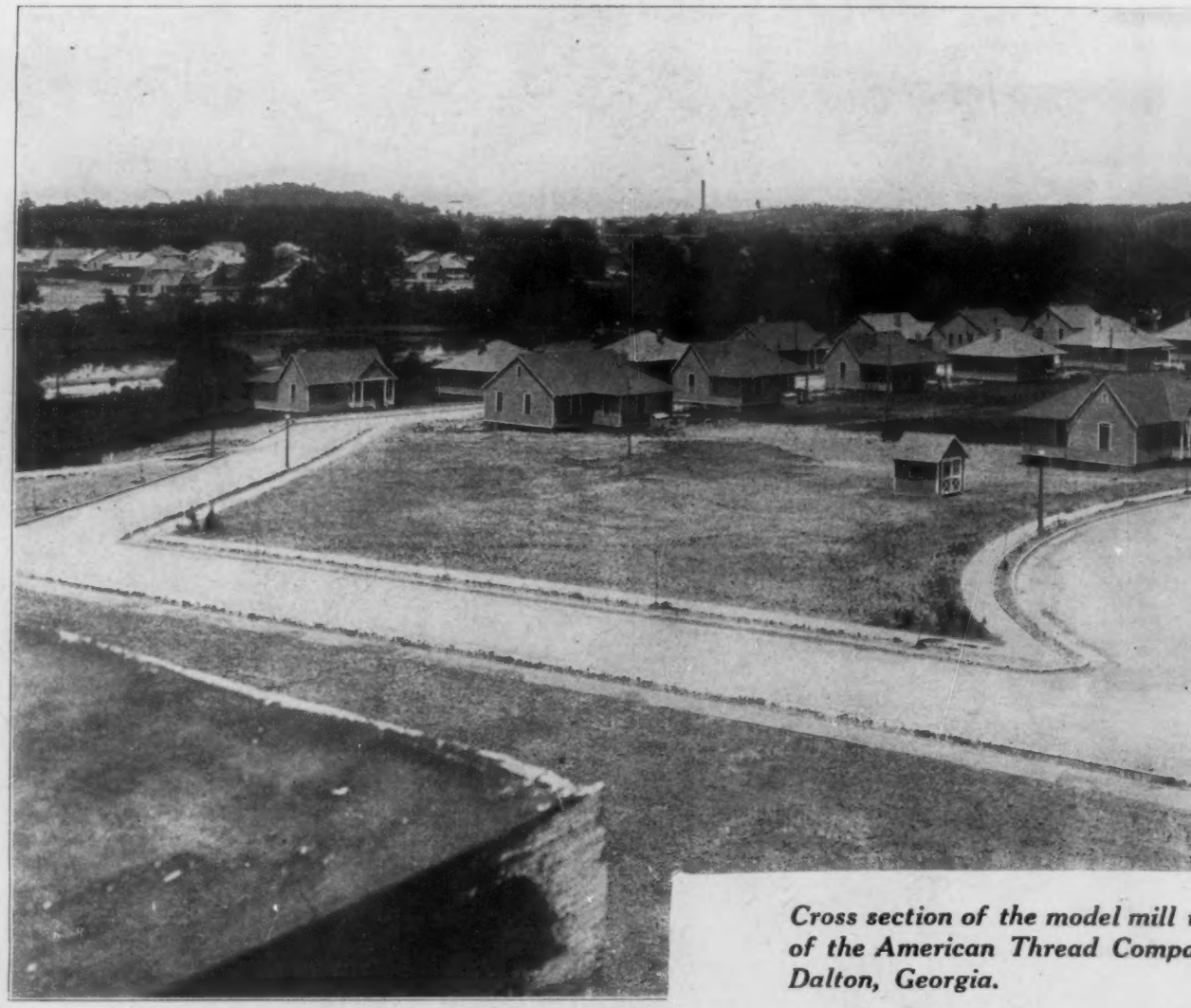
Every textile mill can use Morse Chain Drives to advantage. The Morse Engineer nearest to you understands your power transmission problem. He is at your service.

MORSE CHAIN CO., ITHACA, N. Y., U. S. A.

There is a Morse Engineer near you

ATLANTA, GA...702 Candler Bldg., Earl F. Scott & Co.
BALTIMORE, MD.....1402 Lexington Bldg.
BIRMINGHAM, ALA.....Moore-Handley Hardware Co.
BOSTON, MASS.....141 Milk St.
CHICAGO, ILLS.....Room 803, 112 W. Adams St.
CHARLOTTE, N. C.....404 Commercial Bank Bldg.
CLEVELAND, OHIO.....421 Engineers Bldg.
DENVER, COLO.....211 Ideal Bldg.
DETROIT, MICH.....7601 Central Ave.
NEW YORK CITY.....Room 1871, 50 Church St.
MINNEAPOLIS, MINN.
413 Third St., S., Strong-Scott Mfg. Co.
PHILADELPHIA, PA.....Room 803 Peoples Bank Bldg.
PITTSBURGH, PA.....Westinghouse Bldg.
SAN FRANCISCO, CAL.....Room 355, Monadnock Bldg.
ST. LOUIS, MO. Railway Exchange Bldg., Morse Chain Co.
TORONTO, ONT., CAN.
50 Front St., E., Strong-Scott Mfg. Co.
WINNIPEG, MAN., CAN.
Dufferin St., Strong-Scott Mfg. Co.

619



Cross section of the model mill
of the American Thread Compa
Dalton, Georgia.

THE Georgia Railway & Power Company is glad to welcome the American Thread Company to Georgia and trusts that the operation of its Dalton plant will be so satisfactory that additional Southern units will be built from time to time.

In locating its first Southern plant in North Georgia, the American Thread Company was u
the abundance of labor of the hig
bility of raw material, by the cons
of hydro-electric power, and by th
that permits year round operation w
of extreme heat or cold.

Georgia Railway a

It's Great to Be a Georgian

ATLANTA

del mill village
l Company at

y was undoubtedly influenced by the highest type, by the availa- the constantly increasing supply nd by the North Georgia climate eration without the disadvantages

North Georgia offers to other manufacturers the same advantages that appealed to the American Thread Company and it is these advantages that make close students of the industrial situation agree that the South is the coming industrial section and that Georgia will be one of the great industrial states.

ay and Power Co.

ANTA

Georgia has no State inheritance tax

There are no dark hours
in this Benjamin Lighted Mill

Benjamin Reflectors make every hour a daylight hour, regardless of time and weather, in the great plant of the American Thread Company, at Dalton, Georgia.

The Benjamin line of industrial lighting equipment is complete to meet every lighting need, and is especially efficient in the illumination of textile operations.

RLM Standard Dome Reflector

A splendid industrial reflector for general illumination purposes. Seamless, one-piece porcelain enameled steel. Finished Benjamin green outside and white inside, with the far-famed Crysteel porcelain enamel, everlastingly enduring and made especially to direct and diffuse a pure white light at high efficiency.

Our nearest office will gladly give further information

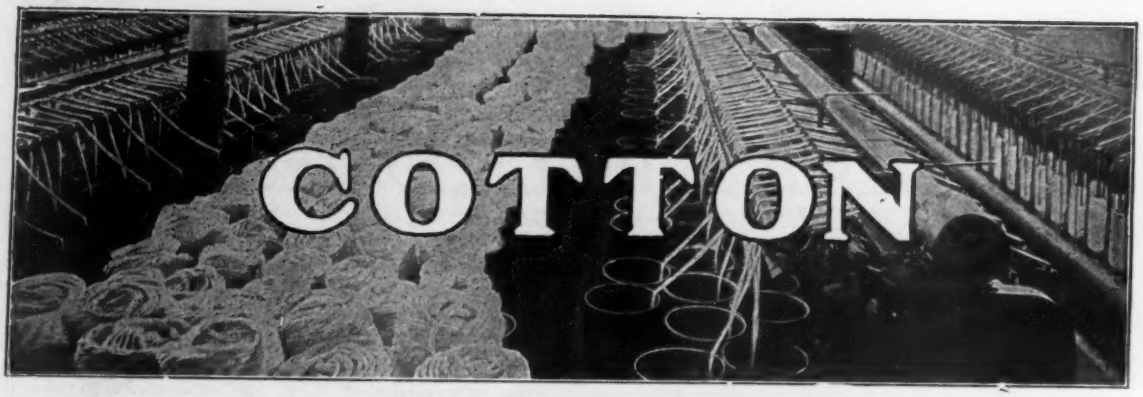
Benjamin Electric Mfg. Co.

120-128 South Sangamon Street
Chicago

247 W. 17th Street
New York

448 Bryant Street
San Francisco

Manufactured in Canada by the Benjamin Electric Mfg. Co., of Canada, Ltd., Toronto, Ontario



October, Nineteen-Twenty-Five

Foreign Trade and Shipping.

Whether foreign trade and ocean shipping are common entities, to be approached from like points of view, as some persons claim, or are separate and largely opposing commercial factors, as others claim, the two by necessity are so closely related as to be, in essence, twins. We had a consequential foreign trade when we had virtually no ocean shipping, and, barring war emergencies, the trade moved without difficulty. We now have a much larger volume of foreign trade, and it seems clear that the net gains coming over from the war will be retained and that the total volume will increase much in future. Also we have ocean shipping, of a sort, or sorts, but its retention in the full is by no means assured and its further expansion is in the realm of doubt.

The problem involved in the retaining and expanding of our ocean shipping will again be prominently before the country soon. The check given to discussion of it by the collapse of the subsidy scheme put forward in 1922 has been dissipated by the passing of time. The confusion due to the pall thrown over the situation by the slump in world shipping that began in 1921 has been cleared partially by improved conditions and the outlook for more improvement.

World trade, which sustains world shipping, has been below even the pre-World War normal for approximately four years. The volume of it is now probably equal to the average of the five years immediately preceding the war. Our part of it is much better than the whole. Our exports and imports in 1924 were of $7,743,491,930 total value. The figures cover merchandise alone. The pre-war average was $3,843,591,624. The war peak, which came in 1920, or after the war, was $13,017,097,061. The figures, being governed by prices do not tell the story with accuracy. Tonnage figures do. Prior to the war we exported to and imported from foreign lands about 75,000,000 tons of goods a year. Last year the volume totaled 93,000,000 tons. Around one-third of this business was carried on with nearby areas, such as the West Indies, Mexico and Canada. As to these our shipping, always substantial, is now apparently secure. The big problem has to do with overseas, or trans-oceanic, traffic.

Prior to the war, not more than 5 per cent of American overseas commerce was handled in American vessels. Now about 30 per cent of "dry" cargoes are so handled. "Wet" cargo means petroleum, carried in tankers, in which specialized field American shipping is secure. American vessels carry a larger proportion of our imports than of our exports. This probably owes in most part to the operations of our industrial carriers, the ore ships of the steel companies and the tankers of the oil companies, and to such lines as those of the United Fruit Company and W. R. Grace & Co., which are subsidiary to other enterprises.

Of overseas "dry" cargoes, about 15 per cent of all, in terms of tonnage, are carried in vessels of the United States Shipping Board. The board operates no ships on the Great Lakes or in the nearby trades, and only a few in the oil trades. The Shipping Board is operating nearly 300 vessels at a loss of $24,000,000 a year. Both the number of the vessels and the losses have been reduced. Its gross income from shipping is between ninety and one hundred million dollars a year.

The proportion of overseas business, aside from petroleum, handled by American ships of all kinds is decreasing, but not much. Private shipping is gaining, largely because of the turning over of Shipping Board vessels and lines to private owners.

The goal defined in the Merchant Marine Act of 1920 —the carrying of the greater portion of American commerce in American vessels—is not being attained. Apparently, it can not be attained soon, except possibly through expending from $75,000,000 to $100,000,000 a year by the Government on new ships and profitless operation of vessels. Much of that act has never been, probably never will be, applied. The ignored decrees include the one which directs the President to cancel all treaties which stand in the way of discriminatory tariff rates on goods brought in in American vessels. Another is the power given the President to bar foreign ships from our Philippines trade, as they are barred from that with Hawaii and Porto Rico and that, via the Panama Canal, from coast to coast. Section 28 of that act also has been passed by. It would allow preferential railroad rates only for such goods for export as are delivered to American vessels.

Succintly, nearly every incidental aid to American shipping, barring outright expenditure from the Treasury, meets with formidable if not insurmountable obstacle. The same is true of attempts to remove those handicaps, such as are embodied in the Seamon's Act, which our laws put upon American shipping.

It is a most complicated problem. One of the biggest complications has to do with the distribution of our for-

eign trade. We have three great outlets, the Atlantic, the Gulf and the Pacific, each more extended than the ocean outlets of any other nation. Our foreign trade, while huge, is not balanced. The tonnage of exports greatly exceed imports. In some cases, as from the Gulf to many European points, the movement is nearly all one way. In the South Atlantic district we import twice as much, in volume, as we export. We have no three-way or triangular shipping. We do virtually none for other countries.

Shipping, normally, is not a highly profitable industry. With us it is not of itself a necessary industry, as it is, probably, with the British; for we have better outlets for capital and labor. It is important to us for two reasons more or less extraneous. One is national protection in case of war, in both a military and trade way, as was exemplified during the recent war. The other is foreign trade. Most of the proposals of Government aid for shipping have the last most in view, ostensibly.

The problem now before the country involves in general the following questions:

What shall be done with the Shipping Board, through which have been spent $4,000,000,000 with little assured fixed results as to the establishment of a secure merchant marine?

Shall Government operation of vessels continue? If so, shall the policy be made a permanent one, and how and by whom in the Government shall operations be carried on?

If private ownership and operation be the policy adopted how shall an ample merchant marine be made certain and secure?

The real issue probably will be over Government operation and a policy of subsidy for private operation.

No one is expected to insist that there be made the experiment of giving the American ship owner and operator a free field, rid of all Government interference, in which to match his skill with that of the foreign owner and operator. Yet when the field was freest, in the early part of the last century, the American merchant vessel was supreme on the oceans of all the world.

"I have always felt that a shipowner who must have 'pap'," declared Capt. Robert Dollar, the outstanding American in the shipping world, a few years ago, "does not deserve to be in the business. We do not need any advantages over the other fellow. We can take care of ourselves. But we do ask for an even break. Government interference and foolish laws so far have prevented that."

Sidestepping the Tariff.

The national administration is turning its face against any meddling with that most troublesome of all phases of national taxation, the tariff duties on imports, during the coming session of Congress. Chairman Smoot of the Senate Finance Committee and the best informed administration adherent of the principle of protection says that there will be no meddling with the tariff by the new Congress. Chairman Green of the House Ways and Means Committee is not so sure that there will be none, and seems inclined to promote some meddling on his own behalf. President Coolidge thinks that the subject had best be let alone at the present time, on the theory that Congress can employ such energy as it may allot to taxes at the coming session much more efficiently by concentrating it towards making an intelligent revision of internal taxation. The business world as a whole no doubt concurs in the position of the administration, not because the present tariff is satisfactory to scarcely anyone but because the status quo may be preferable to those disturbances and uncertainties which attend revision of the schedules. It is politically impossible to revise some without passing legislatively on all—that is unless the revising be wholly political as with, usually, the tariff on certain farm products.

The Fordney-McCumber tariff act, as enacted in 1921, hasn't worked wonders protectively or caused disaster otherwise. Excepting its yield of revenue, it doesn't seem to have had any great effect. There still comes in about as large volume of both dutiable and non-dutiable goods as came in formerly. In 1920 the per cent of imports that came in free was 61.08; in 1924, it was 59.25. The average tax on dutiable goods increased from 16.40 to 37.39 per cent, of ad valorem value. But those of nearly all kinds came in as, virtually, under the last low tariff law. The revenue yield jumped from $325,000,000 to $544,000,000.

The flexible provisions of the present law haven't worked notably as yet and give little promise of proving anything like as advantageous and "scientific" in practice as they are in theory. The Tariff Commission, in applying those provisions, has been on the whole only a miniature Congress, except that it has been more reluctant about doing anything. It has been torn by the same divisions, the same sort of strife, that turns Congress, when dealing with the tariff, into a rather irrational organism. With applications for changes in schedules having to do with trade operations, that are of tremendous volume and import, awaiting action, the board recently, for example, put upon its docket for investigation the tariff duty on imported live bob-white quail!

Taxes and the National Debt.

If present Federal Government tax rates prevail throughout the fiscal year, Uncle Sam will collect, provided normal conditions prevail, from $350,000,000 to $500,000,000 more than will be expended by June 30, 1926. Hence the intent of the Administration to make a further cut in taxes, a cut that will leave in the hands of the taxpayers something like $300,000,000.

Protest, however, is made in some quarters against further drastic slashing of Federal taxes; not on the score that expenditures on running activities be increased but that the surplus might be used in giving speedy retirement to the national debt.

At the height of growth on account of the war, the national debt amounted to about $26,000,000,000. This is a huge sum but this is a big country. Since then it has been reduced to the extent of about $6,000,000,000, or at about double the speed produced by sinking fund operations. Much of it owes to the excellent financing done by Secretary Andrew W. Mellon.

A debt of $20,000,000,000, particularly when on the decline, is not an excessive one for the United States Government, even though the interest cost of carrying it amounts to about one-fourth of all the money the Government collects from every source.

Since the debt is an all but wholly internal one, the interest cost amounts, nationally, only to taking money out

of one pocket and putting it in another. A national debt, Alexander Hamilton said, may be a national blessing. It gives many who otherwise might not have it a foothold in the government. The present one isn't exactly a national blessing but it represents elements of value. One is that, as long as it is a large one, there will be no great haste in incurring new debt for extravagant purpose.

There is no reason why taxes should continue unnecessarily high in order that the retirement of the debt may be further speeded beyond the usual in such cases. If the country continues to grow and expand, as seems probable, and economy remains the rule at Washington, new and lower tax rates still quite probably will yield surpluses which, like the one of the last fiscal year, can be added to the sinking funds for the acceleration of the debt's retirement.

Safety in Textiles in the New South*

BY A. STANLEY LLEWELLYN.†

It would be a waste of time for me to go into detailed methods and systems which are used in safety work. You are all familiar with those and perhaps have more advanced ideas of these than we have in the South. There are, however, a number of features about the southern mill which offer an especially fertile field for accident prevention and safety work which are unlike those of the North. It is these features upon which I will touch.

Having worked in cotton mills both in Massachusetts and South Carolina I have had a chance, in a small way, to observe each field. In order to be able to give you as true and clear a picture of this as possible, I have checked up with Mr. David Clark, of the "Southern Textile Bulletin" of Charlotte, North Carolina, and with Mr. L. L. Arnold, editor of Cotton, the monthly textile journal, of Atlanta, Georgia. The last named, I believe is the man who should be here today to talk to you on this subject. Georgia, according to Mr. Clark, has done more than any other state in the South on a definite safety program. If anyone is interested in the progress which has been made in the southern cotton mill in the last twenty years, write Mr. L. L. Arnold, Atlanta, for a copy of the twenty-fifth anniversary number of Cotton.

We believe that we have greatly to our advantage, the fact that the average textile mill management in the South gets full cooperation from all the employees. This is due to a personal feeling on the part of the management for the employees, because in a large number of cases they live near one another in the same villages. Thus when safety or any other good project is taken up by the management it is immediately taken up by the employees without the antagonism and friction sometimes found where there is no such contact, where a large percentage of the employees are either of foreign birth or foreign extraction.

The cotton mill village, as is ordinarily found in the South, is under the control of and operated in its entirety by the mill organization. That is, we have the mill, the village with the homes occupied by the operatives of the mill and their families, the company store, the church, the school, boy scouts, girl scouts, band, glee club, mother's club, baseball team, and other things. In some mill villages we have a mayor and board of aldermen composed of mill people and elected by the mill people. We also have nurses and in some cases, doctors.

Compare this picture with the northern mill with a large percentage of foreign labor, which makes it more difficult to tell the story of safety. One is not confronted in the South with the problem of how to tell the story in several different languages. We do not have to decide whether it is more to the advancement of education to print all notices in English, which would be an incentive to all to learn English, or whether it is safer to put up notices in Polish, Greek, Italian, etc., so that all will be sure to know the policy of the management.

A typical mill in which I worked in the North employed about two thousand hands. We had groups of mill houses with the plant in which lived four hundred men, women and children. Out of this number two hundred were workers in the mill, or, in other words, we housed ten per cent of the employees. A Polish village was at one end of the town, then a group of English speaking people and overseers in another part. Each of these groups were different. When the mill closed Saturday noon, or even each night, our responsibility for the people closed with it. The children of the people of the mill attended the public schools or parochial schools. All churches, both Protestant and Catholic, were represented, and each person sought his own form of amusement.

A different situation arises in the South, as I have indicated. Our people are with us all the time. We are one large family. The recreation and amusements for these folks are generally concentrated within the mill colony, you might say. There is a ball game Saturday, which most of the mill people attend, and a band concert at night. Sunday the village church is occupied by mill people, it being more or less of a union church. In our particular village it is a Baptist church, but you will find Methodists, Presbyterians and even Episcopalians attending church and Sunday school there.

In the North we had our nurses, but because of the expanse of territory where the mill people lived, some of whom commuted to nearby towns, their work was practically finished with the closing of the mill. In the South the dispensary and nurse's home are generally found in the center of the village and the nurse's work is never done.

It perhaps will be interesting just at this point to tell why and how this independent colony characteristic of cotton mill villages originated. Dr. Mitchell in an article in Cotton, January, 1924, goes into this in detail. We will have time only to touch on this in order to get enough background to be able to see more clearly the present day conditions. In seeking the origin of the present day southern cotton mill village we step back into the old South. Following the war between the states, the poor southern white man had come back from the armies to the same condition, practically, that he left. He was spoken of as the poor white, and he surely was poor. There had been no place provided for him. There were no industries. Cotton was King and the raising of this had preference over all else. The poor whites had to live on the land. A few could get on as overseers on plantations—the rest must be tenants

*Extracts from an address before The National Safety Council at Cleveland, Ohio.

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under mean conditions. Some became squatters on poor, barren lands in the lowlands and highlands. They were poor, illiterate, and knew nothing of industry. This condition continued until about 1880 when the leading men of the South saw that industries were needed in the South to provide work and money for the laboring man, or poor white man, and cotton mills were the most logical. The cry went up: "Bring the cotton mill to the cotton field." Men of the professions, planters and merchants, were forced to the front to put into operation the manufacture of the staple. People looked to ex-slave holders and ex-Confederate army officers and clergymen as leaders to organize and head up this new project. The mills were built, the poor whites came in from their little, old, "no-account" farms and went to work for wages—small to be sure, and long hours—but it was their salvation. The management of the mills was composed of the gentleman planter, ex-Confederate army officers and professional men. The help looked to these for protection and the management in turn felt responsible for all the interests of the people in the mill. These poor folks had come down to the mill with all their ignorance and traditions. No houses were in existence around the mill to take care of this influx of population, no schools or churches, so it was a natural sequence for the mill management to build up every department of life for the workers.

This is a slight picture of what was happening only about forty-five years ago when the South was breaking into the mill business. We can see how crude it all must have been, how lacking in labor laws, safety, and proper machine conditions. However, the seed was sown and today we can see how it has developed and grown. I wish I had time to go into some of the technical improvements in machine conditions which have taken place—the increase of spindles and the improvement in the cloth. I have to confine myself to that which pertains to safety of health and limb. The latest improvements of any kind, the South is eager and willing to study into and adopt, if practical. This not only includes the labor-saving devices which make work easier for the operative as well as increase production, but also is true of safety devices on machinery, machine guards, ventilation and sanitation improvements.

With the steady increase in the South of such agencies as community houses, schools and school attendance, mill nurses and doctors, we are prepared better than ever before to carry on a still greater and a more far-reaching safety campaign than is possible without such a completeness of organization.

Let us now go through, step by step, what is being done—to be sure, not to perfection yet. We have not in many cases the safety engineer with his corps of assistants, nor have we the elaborate systems and methods which are found in some other parts of the country, but we have started safety in the South and it will grow as any good thing will, properly explained and nourished. In our own unique way we are teaching the story of safety. The mill manager realizes that the lessening of accidents, the building up of the health of his people, the saving, perhaps, of the lives of his friends, can all be accomplished through an organized safety program On further study he learns that a direct cash saving can be made in his insurance premium and a decrease in absenteeism and labor turnover, which we all know is a factor today in keeping our costs low. He feels, as do managers in all other parts of the country, that these facts warrant a safety program. You all know how this program is put in force in your respective plants. I will now try to show you how we proceed in the South and where the previously mentioned contact with the people comes in good stead. With the decision made, the manager calls in his overseers, with his personnel manager and nurses. He explains the value of this definite step to these key men, and the following system which is used in some of the mills in the South and is much like some of those in the North, is adopted. The first Council is usually made up of overseers and second hands and never meets without the superintendent, manager or agent being present. The nurse and plant doctor also attend these meetings. The committee meets once a month and all accidents which have occurred are brought up by the nurse or doctor and discussed in detail. The prevention or the recurrence of such accidents is then thrashed out.

For example, at our last meeting we found that the greatest number of accidents in the mill were due to falls, particularly on slippery floors. Out of this has come the experiment of applying a floor dressing of oil and wax and the elimination of scrubbing. Thus far it seems like a good idea. The floors are just kept swept, and the darky with an oiled mop scrubs up around the cuspidors. If this works out we will oil all the floors. This preparation contains a disinfectant and is more sanitary than scrubbing. It saves floors, soap, and scrubbers.

We found that goggles would not be worn because we had but one pair over the emery wheel. Individual goggles were issued and better success is noticeable.

The nurse makes daily inspections of mill and weekly inspections are made by a general inspection committee. Safety bulletins and rules are posted throughout the mill. At least once a year mass meetings are held with moving pictures. Some mills have a mass meeting in their respective departments with talks on the specific hazards of the department. The above program you are all familiar with, and it is in use to a greater extent in the North than in the South, but as with all other things pertaining to the mill, such schemes are on the increase.

With this much done in the mill proper, we carry the program to every man, woman and child connected with the plant.

The nurse, who is a member of the Safety Council, in her daily rounds in the village has a splendid opportunity, with her knowledge of hygiene and sanitation, to scatter seeds of safety and preventive ideas in the home, to the mothers. The attitude in the home toward anything has a very pronounced effect, so that an understanding and acceptance of safety in the home life reacts beneficially in the mill. In this respect we have a great advantage.

Into the church on Sunday and prayer meeting on Thursday, the preacher can and does take hold of the habit of carefulness in every walk of life, even at work in the mill around machinery.

The store manager keeps up with the mill's policy. He learns from the talk at the Recreation Hall or Y. M. C. A. by the agent, superintendent, or doctor, that flies are carriers of germs and that old cans are excellent places for the mosquito to breed. He therefore requisitions screen-covered boxes for his fruits and vegetables; he invents something to crush the cans, and I have known cases where even an incinerator appeared.

In the school, both the mill school and kindergarten,

the teacher is told about the safety movement and the little children are taught not to cross the highway without looking up and down. They are told why vaccinations are made and how essential the tooth brush is in preventing diseases.

The monthly meeting of the Board of Aldermen is held in our village on Tuesday nights. When new business is called for, some fellow starts on safety and after the meeting one may read in the recorder's book something like this:

1. No sling shots or firearms shall be used in the village.
2. Speed signs will be posted in the village forbidding excessive and reckless speeding.
3. Cows will be pastured in a place allotted for them.
4. On path across dam two lights are out. Replace.
5. Bridge over branch on highway should be inspected and if dangerous replaced by proper authorities.

Board of Alderman.

After the business meeting a literary program takes place. The mill doctor is the speaker for this meeting. He tells us how five million men were inoculated in the army and no casualties occurred because of typhoid fever. He explains in plain language the streptococcus germs and sounds the note to get the cut looked at at once. He tells about vaccine and we sit with ears and sometimes mouths opened, learning medicine.

A month or two ago a case of small pox came into our village and another case appeared in a day or two. Immediately the Board of Health at Columbia, S. C., was notified and the two houses were quarantined. To my surprise, because of the educational work which had been done from time to time, three hundred and fifty-two people from the ages of one year to nobody knows how old, were vaccinated, and the epidemic was avoided. If this same thing had occurred five years ago I doubt if we could have vaccinated fifty people.

It would be easy for me, but probably tiresome for you, to give you many examples of how, through understanding and education, the mill people of the South are taking hold of the most scientific methods. We are coming each year nearer to the goal for which we are striving. Our safety work is not advanced as far as yours in the North, but as I have tried to point out, we have started, and because of the agencies through which we are working, this work will develop more and more each year.

In conclusion let me say that I believe that out of the mill villages tomorrow will *not* come the emaciated, washed out, destroyed Anglo-Saxons, but our statesmen, physicians, editors and industrial leaders, as well as a strong, healthy class of high grade American workmen. The work of Safety will play its part, and a very important part it is, in this accomplishment.

Paper as a Competitor of Cotton

BY MURRAY E. CRAIN.

Until about two years ago all of the bags used in the cement industry were of cotton. Then a Chicago concern which had had some experience in the cement industry began production of paper cement bags in a small way. These bags were made of tough kraft paper, with an inside lining, also of paper, which prevented leakage.

The paper bag took hold well in the cement trade, not because of any superiority, but because the use of paper bags eliminated many of the minor troubles which had been vexing cement men. When bags of cotton were used, they were also re-used. This meant that a buyer of cement was charged with the price of the bag until it was returned to the cement manufacturer. Then he was credited with the price of the bags, provided they were in good condition.

When bags were damaged in any way the cement maker usually tried to make the user pay for them. The user didn't feel any particular responsibility for the bags in which the cement was packed, and he objected strenuously to paying for them in case they were hurt somewhere along the route. The result was that cotton bags kept the industry in a continual state of excitement. Squabbles were frequent, and relations which had been friendly for many years were frequently broken off because of some misunderstanding between two members of the trade. The result of all this was that when a paper bag which seemed to meet all requirements was offered, the cement industry was inclined to welcome it rather than ask embarrassing questions.

One of the companies which undertook to manufacture cement bags made of paper which would be satisfactory to the trade is now buying eighty tons of kraft paper daily for this purpose. From this tonnage it is evident that the manufacture of paper cement bags has developed into a business of considerable importance and proportions.

The point of all this is that the cotton and textile trade allowed an important market to slip out of its grasp without making a serious or organized attempt to straighten out the difficulties and hold the business. There is evidence at hand that unless some step of this kind is now taken, a loss of other business will be sustained.

The manufacturers of kraft paper had a hard row to hoe until a year or two ago. Southern pine mills were coming into the market with their offerings, and the total production of kraft was considerably in excess of the consumption. Competition for business resulted in general price-cutting, with the result that the kraft market was nothing less than demoralized.

Consumption of kraft and kraft products began to pick up and conditions became somewhat better. Kraft manufacturers, however, were still using telescopes in looking for business when a considerable volume was dumped into their laps by one of the companies which proposed to manufacture paper cement bags. The success of this company was such that it became an important buyer in the kraft market, and the paper mills began to sit up.

It occurred to them that if a business built merely on an idea could create a market for 80 tons daily, it might be worth while for the paper people to create a few ideas on their own behalf. Some of the kraft manufacturers have begun a campaign for the formation of an association which will engage in research work. With adequate financing and personnel, it is believed that this organization will be able to develop new uses for kraft paper in several industrial fields, thus taking the slack out of the kraft market, and adding something to the possible margin of net profit.

There seems to be no reason to doubt that this association of kraft paper manufacturers will be formed and that it will be reasonably successful in the work it undertakes. No definite prophecy can be made as to where this additional volume of business will come from. The paper men merely wish to increase their own business and are not gunning for other industries. Judging from what has happened in the cement industry, however, it would seem within the range of probabilities that any additional paper tonnage created is likely to come largely out of cotton or some other textile.

From all of this it would appear that if textile men adopt a passive attitude, they are likely to sustain some serious losses. Aggressiveness seems to be the quality which is most needed in the trade today. There is no reason why the same methods planned by paper men cannot be adopted by the cotton trade.

It would appear that before the end is reached, the cotton industry will be forced to spend some money for investigation and advertising. Although paper napkins and paper towels have made considerable inroads on the textile industry, there are still plenty of people who have no use for either and insist on some other kind. If they are unable to get anything but paper napkins at their favorite restaurant, many of them transfer their patronage rather than use the paper article.

This seems to pave the way for some effective advertising by the textile industry, not only as regards napkins, but numerous other articles which are being made of paper rather than cotton. There is a good reason why the Waldorf-Astoria, New York, does not use paper napkins in its restaurants and these reasons form the basis for an advertising campaign which would be of unusual interest.

It is safe to say that unless the cotton trade does do some constructive work in the near future, it will sustain losses even more extensive than those taken in the past Other industries are on the alert, are indulging in expensive research work because they have found this necessary under modern conditions, and are presenting the results of this work to the general public or to the particular trade affected. It looks as if this policy must be adopted by the folk interested in the continued use of cotton.

Textile Operating Executives of Georgia

Discussion of slashing and weaving questions constituted the Fall meeting of the Textile Operating Executives of Georgia, which was held at the Ansley Hotel, Atlanta, Ga., on September 15th. The meeting consisted of one morning session and a "Dutch" luncheon. George A. Franklin, of Augusta, Ga., superintendent of the Sibley Mfg. Company, Enterprise Mfg. Company and Augusta Factory, Augusta, Ga., was elected general chairman for the coming year. John S. Bachman, superintendent, Anchor Duck Mills, Rome, Ga., was made vice general chairman, and Robert W. Philip, associate editor COTTON, Atlanta, Ga., was re-elected secretary-treasurer. Frank L. Asbury, Jr., superintendent, Hillside Cotton Mills, LaGrange, Ga., was elected to the executive committee for a term of two and one-half years, succeeding R. M. Matthews; Frank B. Williams, superintendent, Fairfax Mill of the West Point (Ga.) Manufacturing Co., was placed on the executive committee to fill the unexpired term of Charles A. Sweet, who has removed from the State.

The meeting was opened at 9:30 o'clock Tuesday morning by William W. Arnold, Jr., of LaGrange, Ga., general chairman. After the invocation by William M. McLaurine, secretary, Cotton Manufacturers' Association of Georgia, the men joined in singing one verse of "America," following which Mr. Arnold turned the meeting over to D. W. Anderson, manager and superintendent, Pacolet Mfg. Company, New Holland, Ga., who conducted

The Discussion on Slashing.

The first question taken up was, "For what fabrics are steel harness best suited, as compared with twine harness"? John H. Howarth, assistant superintendent, Lanett Mill, West Point Manufacturing Company, inquired whether this referred to the old steel harness or to the steel heddle now being used. Mr. Anderson explained that it was the steel heddle in the wooden frame to which the question had reference.

The first man to give an experience with using this equipment was John Klinck, assistant superintendent, Sibley Manufacturing Company, Augusta, Ga., who stated that "we are making denims, 28-inch, 68x42, with a 7¾s warp yarn. We were using cotton harness and found a great deal of trouble with it sawing in two, and we have changed and think we are getting very fine results." He explained that this is dyed work. "The trouble with the steel harness," continued Mr. Klinck, "is that it has a tendency to dance together. We have a harness with two bars and that separates the harness considerably on the bar, which helps some. We have had no big trouble so far, but we anticipate trouble by the bars wearing on the notches. In this case the heddles will have difficulty in spacing." He uses the flat, off-set heddle, rather than the twisted wire heddle, it was brought out by Mr. Klinck in response to a question from Mr. Arnold.

"We use steel harness on everything from 2.25 sheeting to 27½-ounce mole-skins," said L. H. Rice, superintendent, Manchester (Ga.) Cotton Mills, "on 4s to 16s yarn. We have very little trouble with them, and if the bars get notched we turn them over, but it takes a long time for them to get that way." He also uses the flat, off-set type, he replied in answer to Mr. Anderson.

Here Mr. Klinck explained that he uses the steel heddle only on his denims, while on his white work, cotton harnesses are working satisfactorily, the white work being lighter without the tendency of the heavier yarn to saw the harness in two.

"Do you use steel heddles on yarns as fine as 30s and 40s"? was the next question, which was asked by John F. Long, superintendent, Beaver-Lois Mills, Douglasville, Ga. No one present answered this question in the affirmative.

"I use a steel harness with two bars on each shaft on heavy sheeting," stated Mr. Howarth, "because on this work I couldn't make the cotton harness last a warp out. This is on 72-inch wide goods, and also on 36-inch goods. I use it on my drills. On some of them, where the whip roll is up, it was not as satisfactory. In fact I would put wire

heddles on all narrow work if it wasn't for the fact that it is objectionable to the weavers, because they cannot get their hands through so easily. But it saves money on harness on heavy sheeting. They do get together, and it is hard to keep them even, but where you have two bars on one shaft you have lots of room, and I like them on this work."

Explaining the "two bars on one shaft," Mr. Anderson

General Chairman W. W. Arnold, Jr.

inquired if "on three harness drill you would use six of these frames," and Mr. Howarth replied in the affirmative.

Mr. Reynolds stated that he uses the steel harness on 30s/2 yarn, also he uses cotton harness on some of his work.

"I like steel heddles for some and cotton for others," said W. H. Epps, superintendent, Jefferson (Ga.) Mills.

"On 5s to 25s, we use steel harness and they are very suitable for most any weave," declared R. H. Seymour, overseer of weaving, Griffin (Ga.) Manufacturing Company.

"I would like to ask Mr. Howarth if it is possible to face that sheeting with the steel harness as well as with the twine harness"? requested Clifford Barnes, overseer of weaving, Exposition Cotton Mills, Atlanta, Ga.

"I think so," replied Mr. Howarth. "I just couldn't make cotton harness run for the length of one warp, no matter how I set it. It would saw the eyes right out. I found the only thing for me to do on the heavy sheeting was to use steel harness. It was a problem to me to try to get some life out of cotton harness. A lot of this goods goes into laundry roll covering, and think I can get just as good a face for this with the steel as with the cotton harness."

"I would like to ask some of you who have tried both, why should there be any difference in the face on steel or twine harness?" queried the general chairman. "If they are set properly, and spaced right, why should there be any difference in the face?"

"I do not know that there would be any difference in the face of the goods," responded Mr. Seymour. "You can use the steel harness for so many different purposes."

"My experience with steel harness," explained Mr. Barnes, "has been that if I was making something on which I wanted a good face, when I would get high enough with the whip roll, it would lie down on me and I would have streaks."

"What do you mean by its lying down on you?" asked Mr. Anderson.

"When the back harness was up and started down it would eat under."

"Is that with steel harness in a frame?"

"Yes, sir, both ways," replied Mr. Barnes.

"As I understand it, on the selvages, where there is a natural draw, the steel harness being loose, it would crowd in there," said Mr. Arnold.

"Not necessarily 'crowd'," said Mr. Barnes. "It would just lie down. If you are weaving something with a small sley and without a face it might be all right."

George A. Franklin, the Newly-elected General Chairman.

"Then you think twine harness will hold its position better?" asked Mr. Arnold. "Yes, sir," was the response.

"I use steel harness on everything from 14s/6 down to 4¼s, 4½s, and up to 14s," said a representative from Hillside Cotton Mills. "We run weaves from two-harness up to sixteen-harness, and get excellent results, and we have some very heavy two-harness weaves. I find that to overcome that raising up and bucking on the selvage, if we use, instead of single cams, a double cam with a long cheek, so that we get the same pull, we get by fine."

"Does that apply to more than two-harness work?" asked Mr. Howarth. "Yes, on four-harness twills also," was the reply.

"I make an 80-sley two-harness twill and I have to watch

that to see that the harness does not get too tight on the bar and make reedy cloth."

"Would anyone recommend steel heddles for 80-sley or more with the warp yarn up in the 30s or finer?" inquired Frank S. Dennis, manager and superintendent, Consolidated Textile Corporation, LaFayette, Ga., but no affirmative answer was given.

Passing on to the next question, Chairman Anderson asked, "How many automatic looms are your weavers operating on your different fabrics? With or without battery hands?"

J. A. Sorrells, superintendent, Gainesville (Ga.) Cotton Mills, replied that "we have from 24 to 32 looms per weaver, with no battery hands; 30s warp and 40s filling, narrow print cloths."

Mr. Anderson turned the discussion to the subject of using battery hands, and it developed that only a few of those present use this method in the weave room. On 100x 60 cloth, said Mr. Long, he uses a few battery hands, with the weavers running 12 looms to start with, "but we intend to get them up after the harness becomes worn. On our other three-leaf twill our weavers run from 18 to 24 looms, with no battery hands on that weave."

J. R. Wikle, division manager and superintendent, Consolidated Textile Corporation, Shelby, N. C., reported that on 80s-square, his weavers run 26 to 28 looms, and on broad cloths, 14 looms, without battery hands.

"I was one of those fellows who said that I would never allow another battery hand in my weave room," said Mr. Dennis, "but some time ago I got into a tight where it was either do it or disrupt the day organization. We made some tests, and we found that, after we made a definite division in the work of the weavers and battery hands, telling the weaver he was to weave and do nothing else, and give the battery hand full responsibility of filling the battery, the weaver could take care of twice the number of looms. On our three-leaf twill, the weavers run 16 to 45 looms. We think where that division is made there is some advantage in having battery hands, but without it, the weaver will nurse his battery, so this is the dividing line in determining whether or not battery hands are successful."

"How much more did your weavers make when they took on the additional looms?" asked Mr. Howarth. "We split the difference with them," said Mr. Dennis, "and we saved in cost and let the weavers make more money." This calculation is made after deducting the cost of the battery hands, he explained.

F. B. Bradley, Eagle & Phenix Mills, Columbus, Ga., stated that, "in our plant we have not been able to allot certain filling yarns to our weavers. They run two and three different kinds of filling—sometimes more and sometimes less—and during the war and right after the war, we used battery hands, when help was plentiful and we could keep a low-priced bunch of help on as battery fillers. We found that they made a large amount of bad work, mixed filling, and things like that, and it was too much of a loop hole for the weavers to put the blame for bad work on the ignorant battery hand, so we stopped the practice. We find since that we get better results by giving the weavers what they can run, from ten to fourteen looms, and letting them be responsible for the filling, threading in the batteries, and all of the loom, you might say. It might seem that we could employ cheap labor for battery hands, but in the long run we do not see where we could accomplish anything by it."

"I believe if each man would state what kind of goods he is running, the number of looms the weavers are operating, the number of filling, the number of picks, and also the sley, it would help in this discussion," suggested W. R. Cook, superintendent, Sunset Textile Mills, Selma, Ala.

"I think the idea or object of this particular question was to bring out the number of mills using a system of separate battery fillers," explained Mr. Anderson, "more than the actual number of looms per weaver, because it would take two or three weeks to state that for all of the mills represented here. You are right; that is the essential thing; the construction determines the amount of looms per weaver."

The next question taken up was, "In weaving a regular three-harness drill or a regular four-harness twill, what causes the twill to be wavy; the wavy effect being not across the cloth in line with the filling, but on the angle with the twill? This was answered by C. L. Williams, service man, Draper Corporation, Atlanta, Ga., who said, "On twills where that trouble is prominent, we find frequently that the harness is irregular, and there is not sufficient friction in the shuttle to draw the filling properly."

"What about the tension on the warp?" asked Mr. Anderson. "That would not apply in that particular case," replied Mr. Williams. "That would make it cloudy straight across."

The fourth question from the questionnaire was, "Where you have distributed your overhead cost on a machine basis, what provision do you make when part of the machines are shut down?"

"We figure our cost on a machine basis," replied M. M. Trotter, manager, Manchester (Ga.) Cotton Mills. "That is, if a machine is shut down it is charged to profit and loss rather than against the production of the other machines."

Mr. Arnold explained the question by stating it referred to such cases as having a surplus of machinery in any given department, rather than to machines waiting for a change, or warp. The idea, he stated, in arriving at the cost on a machine basis, is to get the total overhead, the cost of floor space, machinery, etc., and figure the machine cost, and then the production that goes through that machine naturally is based on that cost.

Mr. Bachman explained that his system is similar to that at Manchester.

In connection with this question, Mr. Arnold said he thought it well to bring in another point—that of the importance of figuring the cost of each individual fabric separately, without depending on a common average for everything manufactured by the mill. In other words, he said, in a mill making a variety of fabrics, and using an average cost, it often happens that the cost is figured too high on the coarser fabrics and too low on the finer constructions. By determining the cost of each individual fabric, the mill is enabled to ascertain which of its fabrics are more profitable to it, as well as those on which no profit is being made.

The result in the market of using such an average cost, he explained, is that competitors will unknowingly offer goods at under cost, thinking they are coming out all right on it, while another mill on the same construction, which

knows the cost, cannot compete on a profitable basis.

A member supplemented this by stating that on at least two fabrics he makes, he knows he is losing money, but that he accepts business on these in order to get business on larger orders on which he makes a profit. He explained that he is able to ascertain these differences by knowing just what each individual fabric costs.

"Quite a number of mills use the number system for arriving at the cost," said Mr. Anderson. "That is all very well where you have only one or two styles, and not much variety. But if you have a very large variety, say for instance, 10s to 30s, and then have high sley and low sley, high pick and low pick goods it is astonishing what an enormous difference there will be in the cost, because we all know off-hand, in certain departments, that it costs just about as much to make the coarse numbers in carding as it does the fine numbers, and under the number system that would be mis-leading. I think the quicker the mills get better cost systems and figure the different constructions separately, the more intelligently they will be able to arrive at their prices."

"We have two separate costs," explained Paul A. Merriam, resident manager, The U. S. Finishing Company, Cedartown, Ga. "One is the actual cost and one the normal cost. The normal cost is figured on the assumption that everything is running up to its normal working capacity, and the actual cost is figured with the overhead spread out over the operations that are actually running. The normal cost is used to determine prices, and the actual cost to let us know where we are coming out."

In discussing this Mr. Bradley related the instance of a mill running an eight-ounce cottonade, 60 yds. a day, and an eight-ounce duck, 35 yds. a day. There was some argument, he said, as to how these costs should be distributed. It was argued that both being eight ounces, they should bear the same amount of cost, "but the way that is figured out it would not be justice to make one fabric bear more overhead than the other one when you are getting about twice as much production in the same length of time."

David Clark, of Charlotte, encouraged this discussion of costs among the operating executives.

The next question was, "What kind of leather is best for covering binders and box plates?"

Mr. Dennis, stating that he had originated this question, explained that the idea of incorporating it was to find out if "that was one of the things that we are accustomed to doing because the man we succeeded did it, and everybody else did it. On spinning rolls we put a cushion under the sheepskin in order to spin our yarn properly. The condition of the binder on the loom has a great deal to do with the amount of power required and if the leather becomes hardened, the amount of power must be increased. We put a cushion underneath the leather, and shaved the leather down to where it was below the normal thickness, and we could notice all of the difference in the world. I have since been told that English mills use water buffalo hide. They say it will hold up under the humidity conditions of the weave room and will not harden. I do not know if we can get away from our old standard practices or not, but that was our reason for asking this question."

The Eagle & Phenix Mills have been trying a good many binders with the rubber cushion under the leather, said Mr. Bradley. "We do not cut the size of the slab leather down, but offset in the wooden binder about 3/32nds of an inch, deep enough to glue this rubber cushion down, and then, when the cushion is in there, it brings the binder back to normal shape, and then the slab leather is put on. Our binder bill has been cut down, and it eliminates bad transfers, and the general running of the loom is improved. It also cut our check strap bill, and we are very much pleased with it, and as our old binders wear out we fix them up in that way."

"How long does the rubber cushion last?" asked Mr. Klinck. "We have some that have been running a year," replied Mr. Bradley. "And, another thing, when the leather wears irregularly, the leather can be taken off and the cushion is left there and you can cover it over again. I have never seen a cushion worn out yet. They may become unglued, but then you can put them back on."

"This may appear to be a simple question," reminded Mr. Arnold, "but the picking motion of a loom takes 75 per cent of the power required on the loom. When you are running more power than is necessary it increases the cost of pickers, shuttles, loom cams, and everything else, because the load is distributed on all parts and causes excessive wear." A question from Mr. Dennis, as to whether anyone knew of a leather that would resist weave room humidity, concluded the discussion on this point.

"What method do you use in issuing and checking up on loom supplies?" was the next question.

"Our supply room is run by a store-keeper," said Mr. Bachman. "He issues supplies on orders and the supplies are charged to the section to which they are issued, and the name of the man who runs the section. At the end of each month we furnish the section men with a detailed inventory of the supplies used during the month."

"We run a supply room like a store," stated Mr. Howarth. "We have a tag on every article, with freight and express added to the costs, and a report goes to the weave room overseer showing the cost of each section, itemized. A man cannot get a casting, or a gear, or a cam, or a box unless he takes the old casting, gear, cam or box to the supply room. These discarded parts are kept, and occasionally the overseers look them over and find what sections are making the most repairs. Since we started that we have saved a great deal on castings, etc. The same thing applies to brooms and brushes."

"Do you carry out that system through the whole plant?" asked the chairman.

"Everything is charged to each section hand, in the spinning room, picker room, and elsewhere, including the cloth room."

"How do you charge oil and harness and things like that?" asked C. P. Thompson, superintendent, The Trion (Ga.) Company. "I do not think we charge oil except to the rooms," replied Mr. Howarth.

In this connection, Mr. Anderson asked the question, "Does any of the mills have a system of charging up shuttles to each individual loom?"

Mr. Jackson, of Douglasville, replied that he has his looms numbered from No. 1 up, and that he has a system of charging the shuttles against the loom number, so that he knows where the shuttles are being broken.

Mr. Wikle stated that he keeps a loom book on belts, shuttles, etc., and that he has found some looms running for a year, day and night, without replacing the shut-

tle, while others will require one in six months. "We also keep this record on spinning belts, and who makes them, so that we can check up pretty close on whose make of belt is best."

Mr. Anderson said he has records of his individual shuttle consumption by looms back to 1907, and it is interesting to learn how many shuttles each loom uses in comparison with another; that the slightest little thing wrong will make a difference. "Our idea is that any loom that is taking more than the necessary number of shuttles is making more bad cloth than one that is using the regular number, because anything that makes shuttles wear quicker has a tendency to make defective work."

"Would it not be advantageous to any weave room to have the looms lined once every 12 or 24 months?" asked T. H. Pennington, overseer of weaving, The Trion (Ga.) Company, after pointing out that oftentimes a new shuttle will not last as long as older ones. Mr. Wikle answered that by re-lining looms he had cut down his shuttle usage from 5 and 6 dozen per month to about 3 dozen a month.

The next question was, "Can a fringe towel be made on a common dobby loom without putting on a fringe motion?" Mr. Anderson read the following replies to this question: "The only way we know of making a fringe towel on a dobby loom without a fringe motion would be to have the weaver pull through the fringe when the towel has been woven the correct length," and "Yes, make the fringes with an empty shuttle." Frank B. Williams, superintendent, Fairfax Mill of West Point (Ga.) Manufacturing Company, declared that the latter answer was possible, but that it is not practicable to make the fringe with an empty shuttle; that the use of the fringe motion is the solution.

"How can a piece of sheeting be woven with the filling tighter than the warp, so that when the goods are calendered, and the warp stretches, the filling will not stretch?" was asked by a member, who explained that he had received this as a specification in an order. Mr. Arnold suggested that he confer with some tire fabric men, as this presented a problem similar to that of off-square, bow and crimp in those materials.

The solution of jerked-in filling on a 54-inch enameling duck was next asked. Mr. Rice, of Manchester, replied that this is just a matter of adjusting the feeler and shuttle. "We use a deep quill cam," he said, "and that helps to hold it out."

This concluded the weaving discussion, and Mr. Arnold re-assumed the chair to conduct the

Slashing Discussion.

"What is the best method of cooking size?" was the apparently well-worn question which began the slashing discussion. J. W. Hames, superintendent, Exposition Cotton Mills, Atlanta, Ga., was requested to explain his method. He said that he uses a closed kettle in this process, and cooks it under pressure. Responding to a query, he stated that they use no temperature regulation devices, but have a recording thermometer on the kettle, which is controlled by hand. He uses thin boiling starch, and lets it stand for one hour under pressure. "How long do you hold it in the kettle before you put it down into your size box?" was asked. "We use small kettles so that we replenish the size in the circulating kettle as often as possible, and turn it down as soon as we get through cooking it," was the response.

"When you put your ingredients in the cooking kettle, do you put them in all at one time with the cold water?" asked the chairman. "We mix our ingredients in large tanks, with the starch, compound, and everything and a part of the water, and this paste is pumped into the tank and then the balance of the water is added and the steam is turned on.'

"Do you break it up better by cooking it under pressure?" inquired Mr. Arnold. "We think we get better results from it, because we can control the amount of condensation better. We have a glass gauge on the side, and after it is cooked, if the condensation is not quite as much in one kettle as in another, we add a little more water to bring it up to a point on the gauge," answered Mr. Hames, who added in response to a further question that he does not test for specific gravity or consistency.

"Does anyone control the temperature in cooking; or do you just open the valve and bring it to a boil?" was the chairman's next general question.

"What do you mean?" inquired Mr. Howarth.

"When you get your batch ready, do you bring it to a boil immediately, or gradually?" explained Mr. Arnold.

"We bring it up gradually about twenty minutes, and then after the agitation it is opened wide," said Mr. Howarth. "I should say it comes up to about 150 degrees before it is wide open."

W. L. Phillips, superintendent, Social Circle (Ga.) Cotton Mills Company, was requested for his experience, and stated that, "we have our slashers fully equipped with controls, the cooking kettle, the storage kettle, the size box and cylinder. We open the steam wide open at 75 pounds pressure, and in fifteen minutes it is 212, and this control holds it at 212 or whatever we set it at for one hour and fifteen minutes. We use thin boiling starch. We have used it for years, although I have never been convinced that it is equal to thick boiling."

"We use pearl starch with 75 per cent water, and bring it up to 180 degrees for 30 minutes and then bring it up to a boil," said Mr. Wilke.

"Why do you do that?"

"In order to convert the starch from pearl to thin boiling form through the use of arcy," explained Mr. Wikle.

Mr. Newsom, of Columbus, stated that he uses both thick and thin boiling starch.

At this point Mr. Arnold outlined some experiments which had been carried out in his own organization. "We find," he said, "that a great deal depends upon how quickly or how slowly you bring the temperature rise up from the cold batch to the boiling point. It makes quite a little difference. In one of our plants, where we were using 110 pounds of thin boiling starch and getting certain results, we opened the valve, and brought it up to the boiling point as quickly as we could. After regulating that temperature rise from the cold batch to the boiling point, letting it take 40 minutes to come to a boil, we found that we could cut down to 95 pounds of starch and get a much better and a smoother starch, with more adhesiveness. We found it best to hold it for 20 minutes after bringing it to a boil.

"On the thick boiling starch, we took one hour to bring it to the boiling point and then held it for fifteen minutes.

"By controlling the temperature rise in this manner

on thick boiling starch we have gotten as good results as with the thin boiling and, of course, use much less starch.

"It's the same principle as cooking a cake. Your wives who know how to cook cakes don't get the stove red hot and then stick the cake in the oven. It would fall or sag in the middle. You must watch the temperature. In cooking size you must break down that starch cell and expand it until it will take up the proper moisture content. If you don't it will be just like it is when you pour a bunch of starch into water. It will lump up, and if you will take those lumps out and break them up and examine them under a microscope, you will find that they have formed capsules, and there is a dry section inside of those capsules."

As to how he put on the same percentage of size after reducing the amount of starch, Mr. Arnold answered a question by stating it was due to a better penetration of the size into the yarn. The compound must of course be regulated, as well as the speed of the slasher. He added that, in his opinion, by cooking thick boiling starch correctly, controlling the temperatures and taking the proper length of time to bring it to a boil, equal results could be secured on thick boiling starch as on thin boiling, with less expense in the total sizing cost.

Mr. Wilke explained a system of shutting the main valve to the size kettle and using a little by-pass, which brought the size to a boil gradually.

About the same amount of shedding on thin and thick boiling starch was reported by Mr. Arnold in response to a question.

"I believe we will find in proper regulation or control of the cooking of size that, regardless of the starch you use, shedding will be largely controlled; that is, if the starch is properly cooked, you will get less shedding," declared Mr. Thompson, of Trion. "Most of us can go to a slasher and rake it and find particles of starch unopened. If that has been properly cooked and given time enough, I believe it is possible to open all the starch and get it on the yarn and cut down shedding, and by so doing we will get the same weight with less poundage."

"That has been our experience," declared Mr. Arnold. "You break down the starch cell and get it more thoroughly into solution, and you will necessarily have less shedding."

"I wonder if it is a fact that some mills really cook the size too much," suggested Mr. Anderson. "You know, fifteen or twenty years ago the common method was under cooking, but the mills began gradually putting in additional kettles, and I think the majority began cooking the size sufficiently, and then cooking it too much. Is there any danger in cooking size too long?"

Howard J. Files, A. E. Staley Mfg. Company, Decatur, Ill., was requested for an opinion, and stated that, "I believe there is not much danger in cooking size too much provided you have corn starch and the proper sizing compound. You can cook potato starch too much. Corn starch will stand boiling, and I believe there is more danger in not cooking it enough than in cooking it too long."

Mr. Arnold asked his opinion as to the best way to bring size to a boil, and the chemist replied that in his opinion the important point to watch is the time after the size is brought to a boil.

"Well ,suppose we have a thick boiling starch and it takes an hour to bring it to a boil—would it be better to do this, or bring it up in twenty minutes and hold it at boiling for an hour?" continued Mr. Arnold.

"I think it would be better to bring it up in twenty minutes and hold it for an hour," was the reply.

"What would be the proper length of time to cook starch after the boiling point is reached?" inquired Mr. Anderson.

Mr. Files stated that it depends on the kind of work being put through. "If you are sizing heavy yarn and desire penetration, thin boiling starch should be boiled 45 minutes to an hour, and thick boiling from an hour and a half to two hours, and then provide for the condensation of the steam and bring it to a definite volume."

"Should warps come off the slasher entirely dry or slightly moist, and why?" was the question used to open the next discussion. Mr. Klinck wanted to know, aside from the personal judgment of the operative, whether there is any method of determining the amount of moisture in warps at the slasher, no affirmative answers being given.

"I have two slashers with Powers temperature control on them," stated Mr. Howarth, "and when those warps come off of the slasher, I can put my hand on them and they are cool. I can go right over to the other slashers and they are warm. That control is the first thing ever put on a slasher that showed me I had been doing something wrong for 35 years." He stated that the amount of moisture in the warps off of the slasher with the regulators was about six per cent. When he tried to go to eight per cent he said he encountered serious danger of mildew.

"I don't think there is any doubt in our minds that it is an advantage to have warps come off moist," declared the general chairman. "Most slasher men run their slasher too slow, and they tell whether the warp is dry or not by how warm it it. Just as Mr. Howarth brought out, the temperature control gives a better idea in dealing with the slasher man as to how the warps should feel on the slasher where the control is not used.

"In one of our mills we had a slasher running 16 yards a minute with 11 pounds of steam pressure. We found that by putting on seven per cent moisture with the same speed the warp did not feel wet. If you will instruct your slasher man to let his warps feel cool when they come off, and run it at the speed to get that effect, or cut the steam pressure down, either one, you will get between 6½ to 7½ per cent. You will probably have to use something to prevent mildew then.

"I venture to say that 75 per cent of the slasher men could speed up their slashers and get better results. Of course we could find these things out by checking up on slashers that have temperature controls, and running at the proper speed, and then we can get the other slashers operating on the same basis, by the feel. We had the slashers at one mill equipped with temperature controls, and I stood around several hours and thought I had it, and then I went to another mill thirty miles away, and speeded up the slashers, and the slasher men told me I would mildew all the warps. But I took the responsibility for the warps in the weave room, and we have not had any mildewed warps, and we increased the speed about 20 per cent."

In connection with his slashers which are controlled, Mr. Howarth said they start out with eight or nine pounds pressure in the morning and when the control starts in, this

might drop to a half a pound or vary between one and two pounds, so that there is not much chance of mildew.

"Are your slasher sides insulated?" asked Mr. Sorrells.

"No, but I have a new one being put in now that is insulated."

"In starting up your slashers in the morning when the cylinders are cold, as I understand it, this valve is practically wide open, and then the control operates?" asked Mr. Anderson.

Mr. Howarth explained that the control does not work until a certain temperature or heat is attained.

"I have the same control that Mr. Howarth has," said Mr. Phillips, "and we leave in eight per cent at 152 degrees Fahrenheit on the cylinder, and that is for 3,000 ends of 22s yarn in the warp. We run 21 yards per minute. We kept speeding up on the slasher until we got as much moisture as we wanted, and had the percentage of moisture determined. Then we had the speed of the slasher and the temperature and established that as a standard, for each different beam. I have run six warps on a stretch without a pound of steam. Four of those ran without taking the cloth off, 570 yards. One had one defect, one had two, one had two and one four on those 570-yard cuts of cloth. We do not run as high a temperature as Mr. Howarth does. It will take eight pounds of steam until the cylinder gets hot, after that we forget it, even if it gets to zero. I wouldn't run a slasher now without temperature control on it. We do not use anything to prevent mildew. I use rectified tallow and a gum and control it everywhere in the cooking."

"Will 152 degrees dry 4,000 ends of 22s if it would dry 2,200 ends of 30s, or would it be necessary to change the temperature in the lighter set?"

"You would regulate the speed of the slasher and run the lighter set faster," explained Mr. Arnold.

"We have different widths of loom beams," said Mr. Philips, "and we regulate the speed by running from 20 to 24 yards per minute with the same temperature."

Mr. Wikle asked if anyone had tried a lower temperature on the big cylinder and a higher temperature on the small cylinder. He stated he is doing this, and that it has a tendency to prevent "frying" of the yarn, as it makes the drying a little more gradual and it doesn't cook it on the outside."

"What kind of hood have these gentlemen over their slashers?" asked Mr. Long.

"I have a cypress hood all over the slasher, and do not use an exhaust fan to pull the heat out," said Mr. Phillips. "There is a pipe out the top."

"Are your slashers insulated?" asked Mr. Sorrells.

"One is and one isn't; the one that is insulated takes less steam than the one which is not," was the answer of the gentleman from Social Circle.

The third question from the questionnaire was, "Has potato starch or any other starch any advantage over corn starch on your class of work, and why?"

Only one man, R. H. Seymour, of Griffin, indicated the use of potato starch. He said he had been using it for five or six years, on goods ranging from heavy goods to towels and wash rags. They adopted it, he stated, because it increased their production, due to the fact that it requires only about 20 minutes to cook it, and they only have individual kettles on the slashers. He uses about 45 to 60 pounds of potato starch, while he used 100 to 110 pounds of corn starch. His cooking kettle, he said, holds about 115 gallons. Rectified tallow, with a portion of raw tallow, is used as an ingredient. Some of this is colored goods, he mentioned.

"Do you notice any difference in the looks of the color of the goods where potato starch is used?" inquired Mr. Howarth.

"No, sir, we use fast colors that stand the bleach, and also use direct colors on the raw stock," responded Mr. Seymour.

"But isn't the potato starch more transparent?" asked Mr. Howarth, and the reply was in the affirmative.

"Why did you quit using straight tallow as a softener in your size mix?" was the next question put by Mr. Arnold. He explained that this question "might not apply to a lot of you because you never did quit, but what we want to bring out is why it is not better to use tallow instead of some softener. In other words, the man who asked this question felt that in buying these softeners, he is getting a lot of oils and fats without the same softening qualities of tallow; that you could take fewer pounds of straight tallow and get the same results.

"My objection to using raw tallow," said Mr. Seymour, "is that the animal matter, after it begins to cool, produces a certain amount of grease and after that it rises to the surface, and you must keep it at 190 to 212 degrees to prevent this. Then you will find it on your goods, and you can smell it also. It has a very rancid odor. That's why I use a patented compound with my raw tallow, to hold down that animal matter."

"I think myself that the rectified tallow goes into solution more readily," said Mr. Arnold.

The final topic discussed concerned the best ingredient to use for preventing mildew. Mr. Arnold stated that, putting in about eight per cent moisture, he found some mildew, and that he uses about three ounces of creosote to a kettle of 150 gallons of size.

The opinion of Paul Seydel, of Atlanta, was requested by one of the members.

For preventing mildew, Mr. Seydel recommended the use of a permanent salt. He explained that most organic compounds are very easily carried away by steam—and that such organic antiseptics as creosote, carbolic acid, salicylic acid, benzoic acid, etc., are subject to volatilization on the drum of the slasher, when it is heated to a considerable temperature, so that there probably is no trace of the antiseptic when the warp leaves the slasher.

Zinc salts—sulphate of zinc, oxide of zinc, carbonate of zinc and zinc chloride—are among the most efficient and most readily available antiseptics for preventing mildew, he declared.

Asked for a specific recommendation by Mr. Arnold and Mr. Anderson, Mr. Seydel stated that a proportion of one per cent would be sufficient to prevent mildew under ordinary conditions, with not more than eight or nine per cent moisture in the warp.

Questioned as to formaldehyde, Mr. Seydel declared that this is the most volatile of all, as a temperature of 200 degrees will eliminate it. Creosote, he said, also evaporates rapidly, and that carbolic acid is an aromatic compound of the same family.

With seven per cent moisture in the warp, something to prevent mildew is necessary, declared Mr. Seydel in response to a question from Mr. Arnold.

"Well, would there be danger of using too much antiseptic?" inquired Mr. Anderson.

"No," said Mr. Seydel, "for the necessary proportion is too small. For example, take zinc chloride, which has been accused of decomposing into zinc oxide and hydrochloric acid. This occurs only at a very high temperature, and there is no possibility of its happening in sizing. Zinc chloride is fused at 400 degrees, but it does not decompose there."

A member asked the difference in decomposition between zinc chloride and calcium chloride.

"Zinc chloride will decompose sooner than calcium chloride," answered Mr. Seydel. "Calcium chloride attracts moisture, and it has no especial antiseptic value, while zinc chloride is a powerful antiseptic, and retains three to four times its weight in moisture under ordinary temperature conditions. You could eliminate the water from either zinc chloride or calcium chloride, but it would take a high temperature to accomplish it."

He stated that neither will decompose to an extent of injuring cloth under 1000 degrees F. As an instance, he said, take one per cent of zinc chloride to 100 pounds of cotton cloth, which would be one pound of zinc chloride. With five per cent decomposition, that would be one in twenty thousand, which would be too small a trace to have any effect whatever.

Mr. Seydel answered further questions by stating that zinc chloride, so far as he had been able to determine after years of study, will have no dangerous effect in the finishing of the goods in the amounts used for preserving. In explaining his recommendation of one per cent of antiseptic, he stated that this referred to one per cent of the dry content of the size.

Mr. Arnold asked him, with reference to zinc chloride, if he would recommend a "good commercial" brand, and Mr. Seydel stated that he would, but added that it is very hard to find, and that and zinc chloride purchased should carry a guaranteed analysis.

This concluded the discussion, and the members repaired to the usual "Dutch" luncheon, where music was furnished by Tucker's Entertainers. The procedure of the meeting was altered, as all of the discussion was held during the morning session, thus dispensing with an afternoon meeting, the luncheon concluding the meeting.

Machine Calico Printing

BY WILLIAM B. NANSON.

The Direct Dyeing Colors.

The direct dyeing colors do not find much use in "steam styles" and are only used for tinted backgrounds for goods which have been previously printed. Their shades are neither fast nor bright as the basic colors, nor so fast as the mordant colors. It is usual to print them with the addition of phosphate of soda, the slight alkalinity of which aids in their penetration of the cloth. If they are required to be fast to soap a further addition of albumen is made.

The direct colors possess the property of becoming fixed on the cotton fiber without any mordant and for styles that do not require any washing they are valuable but not fast.

The colors are varied and include them all, and they all can be applied in the same way. The direct color printing paste is as follows:

{ 50 grams Direct color (any)
{ 400 grams Boiling water
520 grams Tragacanth thickening 6 per cent
30 grams Phosphate of soda

1000

Heat together and cool when solution is effected. Print, steam one hour and wash.

The same with Albumen:

50 grams Direct color (any)
200 grams Boiling water

Dissolve and add

30 grams Phosphate of soda
450 grams Gum tragacanth thickening 6 per cent

Boil, cool and add

270 grams Blood albumen solution 40 per cent

1000

Print, steam, wash and soap.

Glycerin helps the fixation of the foregoing and all direct colors, it is said. They are goodlooking but not fast, and are seldom used except as discharges, etc.; of this (discharge style) we shall speak later.

The "Loose" Steam Style.

This style is mainly thought of by the fugitiveness and brightness of its colors. Any color that will give the right shade is used; its fastness is of no consequence. The goods are not required to be fast to any operations; even steaming is dispensed with unless it is cheaper to use a mordant color or than making up any special color. It is usual to prepare the cloth in oleine and the goods after printing and steaming are finished at once by hot calendering or back starching.

It is quite customary to use the Alizarine red for the loose work and the olives and browns and the blacks and chocolates are usually mordant colors because they are the cheapest, but the pinks are generally phthalein colors like Eosine or Phloxine, or Rose Bengals, and the Yellow Auramine or Thioflavine T without tannic acid; and the greens, blues, violets and oranges are basic colors without any mordant. Basic aniline colors that are printed without a mordant upon oiled cloth are somewhat fast and quite bright, but cannot be regarded as fast to either light or soap.

Crocein scarlets and Amaranth or Ponceau are "loose" and are all used on cotton. They provide very brilliant shades, but all wash out in soap. All dark colors like blacks, navy blues, or chocolates, also olives are composed of mordant colors and are mostly dyed without mordants, and the lighter colors are basic colors simply thickened with oil and aluminates or not. For Eosines and all acid colors proceed as follows:

Eosine Pink (with chrome)

{ 25 grams Eosine Pink or Erythrosine
{ 250 grams Water
650 grams Starch paste

75 grams Acetate of chrome

1000

All Phloxines, Rose Bengale, Eosines, Arythrosines, Uranine yellow, and other phthalein colors may be made up this way. If it is so desired the chrome can be left out, but it prevents the color from running.

Crocein Scarlet (with alumina)

35 grams Crocein scarlet (any brand)
350 grams Water
515 grams Tragacanth 5 per cent
100 grams Acetate of alumina 25 degrees Tw.

This arrangement will answer for all kinds of oxy-azo colors like Crocein; also for Naphthol yellows, etc., for which alum may be used. The Alkali blues and the soluble blues may be used in just the same way.

Soluble Blue.

35 grams Soluble or Alkali blue
300 grams Water
50 grams Ammonium citrate 20 degrees Tw.
50 grams Neutral Turkey red oil
515 grams Starch tragacanth paste
10 grams Acetate of Chrome 30 degrees

1000

All of the ammonium and sodium salts of the Rosanilfine blue sulphonic acids can be used in the same way.

It is only for decorations or temporary styles that the "loose" type of printing is used. It may be of some value commercially, but it is of no value whatever nor interest to us technically. The patterns may be good but the colors are common, and though bright, are crude and offend the eye and are fugitive.

Covering and padding styles are not restricted to any particular style or class of coloring matters and may as well be described in this place as any other. The effects got by padding and covering are in fact entirely due to the mechanical means in which the color is applied to the goods. The chemical operations involved in fixing the colors on the cloth itself have nothing to do with its name.

A covered or padded calico print shows a pattern of some sort either colored or white and colored, on a plain or figured colored ground, and is different from a regular colored print, not only in appearance, but in the manner in which it is printed which allows of any number of patterns being printed or covered with the same roller. Now these patterns are printed at different times and then all may be covered or padded at the same time, thus saving a great deal in both engraving and copper.

A pad roller is so engraved that it prints a uinform flat tint over the whole surface of one side of the cloth at one printing while a cover roller is a roller (copper) which has engraved all over its surface a pattern of some sort as a fine check or a trail or a honey-comb or a series of spots or oblique lines. It is quite obvious that if a light color is printed with either of these colors on a ground already printed within a darker pattern, the latter will show through the light ground and its darker color will mask the paler tint of the overprint. When a white pattern is required on a colored ground got in this way, the goods are first printed with a mixture containing some substance or substances capable of preventing the fixation of the color applied by pad or cover roller. These mixtures are known as "resists" or "reserves" and they set in various ways, sometimes destroying the coloring matter, sometimes preventing its combination with the mordant and sometimes forming a soluble and unstable compound with the mordant, which is washed out of the goods in the subsequent operations. Aside from their chemical action "resists" also act mechanically by obstructing the entrance of the color into the body of the cloth to be printed. Occasionally their action is entirely mechanical.

I might say here, in passing, that the citric acid (or tartrate of chromium) is the resist most commonly used for Alizarine Pinks. The usual way of producing a red and white pattern on a pink or red ground by steaming is as follows:

(1) In the first place, print a two-color design on oiled cloth in steam Alizarine red and a thickened solution of tartrate of chromium. Dry the goods, and then:

(2) Overprint them with either a pad or a cover roller in steam Alizarine red or pink. Dry well.

(3) Steam for one hour in a continuous steamer, wash well, and soap.

Wherever the chromium tartrate has been printed, the ground color printed over it either by pad or cover roller will have been prevented from developing in the steaming operation; while in the subsequent washing and soaping operation it will be removed entirely, carrying along with it those portions of the undeveloped color which fell over it in the second printing, and leaving a more or less perfectly white object in its place. The red is, of course, unaffected by the over-printing, and develops in the usual way; so that the final effect obtained is that of a red and white pattern on a pink ground. The ground will be plain or "patterned" according as the roller used in the second or over-printing was a pad or a cover.

A red pattern will, if large enough, show up well on a fine red *"cover"* but it is almost needless to point out that a *"pad"* should always be lighter than the lightest color in the pattern to be *"padded."* By using suitable resists the same effects as the foregoing can be got with the insoluble azo colors, sulphide colors, basic aniline colors, aniline black, iron and aluminum mordants (dyed style) and, in fact, with almost every group of coloring substances known.

The object of both the "resisting" and the "discharging" processes is the same, i.e., the production of a white or a colored design on a colored ground that has not been specially engraved for it. The principal difference between the two, aside from chemical questions, is that in the case of "resists" the development or fixation of the ground color is prevented altogether, while in the case of "discharges" the fully developed ground color is subsequently destroyed by the oxidizing or reducing action of the discharging agents, that is to say, it is bleached out.

The compound colors and the dyed style of color have already been treated of in previous issues of COTTON, and so will not be written of here.

"Raised styles" is rather an old expression and is used to signify that an insoluble salt or oxide is produced on the cloth and fixed by the process of precipitation. The most typical sample of a raised color is chrome yellow, which is got by printing the cloth with a soluble lead salt and, after drying, precipitating the lead as a chromate by bichromate of soda. Other raised colors are iron buff, manganese bronze and chrome orange and chrome green. Also colors produced or printed with Catechu, Quercitron, Persian Berry and Logwood and also other vegetable dyestuffs "raised" in hot solutions or bichromate of soda or mixtures of this and ferrous sulphate. Prussian blue is

also regarded as a raised color as it requires "raising" or oxidizing in bichromate of soda.

All colors that can be "raised" together in the same raising liquor can be printed together in combination. Thus, Iron Buff, and Manganese Bronze, and sometimes Chrome Yellow may be printed side by side; also Persian Berry, Catechu, Logwood Black and some of the Redwood extracts can be all printed together in multicolor patterns.

To the dyer of piece goods, chrome yellow and chrome orange or only normal chromate (yellow) and basic chromate of lead (orange). Both are precipitated on the fiber from a lead salt that has been previously applied to or printed on the cloth, by chromate of soda (or potash) and the orange is got by treating the yellow to a bath of lime (boiling) which converts it into a basic chromate. I would say here that the deepest oranges are got from a lead acetate in a basic state. It is best to print the thickened solution on a cloth that has previously been padded and dried in a solution of soda and of sulphuric acid or sulphate of magnesia of 2½ to 3 per cent, or a plain white cloth will answer but is not so good. Aniline black or any other color that can be fixed with a short steaming, and that is unaffected by bichromate of soda (or potash) can be used with the lead colors.

Yellow P.B.

120 grams Lead acetate
100 grams Lead nitrate
450 grams Water
Dissolve together, and without cooling add:
80 grams Flour previously mixed into a paste with
250 grams Water

1000
Boil and cool.

Yellow P. B. C.

650 grams Lead carbonate 50 per cent paste
250 grams British Gum paste 25 per cent
100 grams Starch paste 12½ per cent

This yellow can be worked with aniline black.

Lead Carbonate (for foregoing formula)

34 kilos Lead acetate
200 kilos Water
Add gradually with constant stirring:
12 kilos Soda ash
100 kilos Water

The lead acetate must be neutralized with the soda, then allowed to settle and washed three times by decantation; then it must be filtered until the paste contains 50 per cent of lead carbonate. The foregoing should contain 47.9 kilos of 50 per cent paste.

Orange P.B.

200 grams Lead acetate
100 grams Lead nitrate
550 grams Water
90 grams British gum
50 grams Flour or Starch

1000
Boil and cool.

Orange P.B.B.

50 liters Basic lead acetate solution
5 kilos Flour
Boil and cool.

Basic lead acetate solution.

900 grams Water
600 grams Lead acetate
225 grams Litharge

This lead acetate solution must be boiled one hour, and then allowed to settle, and use only the supernatent liquor after it is clear for Orange P.B.B.

After all of the foregoing colors are printed and dried, they must be developed at once in the various chrome baths given in the accompanying table into the shade desired.

CHROME BATHS

For:	Yellow P.B. (Grams)	Yellow P.B.C. (Grams)	Orange P.B. or P.B.B. (Grams)
Bichromate of Soda.	25	25	100
Sulphate of Soda...	100		
Common Salt		100	200
Water	1000	1000	1000

The goods that are printed for yellow or orange are "raised" or "chromed" at full width and continuously at 80 to 85 degrees C. and the rate that they run through the chroming machine depends entirely upon its size, but it ought to be built so that the goods will spend about two minutes in the liquor. After they are chromed the goods should be well washed, and if it is necessary, open soaped before drying.

If the goods are for oranges they must be "after-chromed" as stated, well washed and passed through a bath of clean boiling lime water containing 40 grams of quicklime and 10 grams of bichromate of soda per liter of water. Wash well and dry. If the patterns contain aniline black and any of the wood extracts or steam Prussian blue they must be steamed in the rapid ager before chroming.

Iron Buff.

This color (oxide of iron) is got by printing ferrous sulphate or ferrous acetate on the cloth and then running through caustic soda and exposing to the air.

Iron Buff Printing Color

500 grams Ferrous acetate
500 grams British gum paste

1000

They are printed, dried, and then run through caustic soda at 4 degrees Tw., at 75 degrees C.; they are then allowed to lie in a heap or on a roll until the ferrous hydrate is fully oxidized, and then wash off in water. It is a rather more expeditious way of doing the oxidizing if the goods are given a short run through the rapid ager before they are "raised" in caustic soda or they may be treated to a dilute solution of chemic after the caustic bath, or the bleaching powder may be added to the caustic soda.

Iron buff combined in some way with aniline black is used largely as a "blotch" in making black and buff handkerchiefs for the East. It is very fast to everything but acids.

Manganese Bronze.

Hydrated peroxide of Manganese is placed on the fiber and is usually called manganese brown or bistre. It is very fast to soaps, alkalis, and acids, but it is easily destroyed by reducing agents, i.e., if they are acid, which converts it into soluble manganous salts. It is dyed first into a manganese brown as follows:

(1) The cloth is first padded through manganese chloride ($MnCl_2$) at 72 degrees Tw. and then dried up.

(2) Run it through cold caustic soda, 25 degrees Tw. Squeeze out the excess and run again through cold caustic soda, 10 to 12 degrees Tw.

(3) Wash it well and then pass it through chloride of lime, cold, at 2 degrees Tw., until the manganese hydrate is quite, by oxidation, turned into a dark brown manganic hydrate, then wash well and dry.

This gives us a dark, rich, fast brown, and it contrasts well with all the patterns discharged upon it. The pro-

cess can be shortened or quickened by adding chloride of lime to the soda bath.

Colored discharges of all sorts can be secured from either the vegetable colors, mineral colors or the basic anilines. The recipes as given herewith are an illustration of the way that typical discharge pastes or color pastes can be prepared.

Discharge White M.N.

400 grams Water
150 grams Light British gum
130 grams Tartaric acid
320 grams Stannous chloride 120 degrees Tw. (60 per cent $SnCl_2 2H_2O$)

1000

Stannous Chloride 120 degrees Tw.

960 grams Tin Crystals
640 grams Water

1600 = 1 liter.

Discharge Blue M.N. (Prussian Blue)

Standard: 605 grams Water
37.5 grams Yellow Prussiate of potash
100 grams Starch
60 grams British gum

Boil and add, in order,

120 grams Tartaric acid
60 grams Oxalic acid
68.5 grams Nitrate of Iron 90 degrees Tw. (40 per cent $Fe_2(SO_4)_3$)

1050 or 1000 when finished cold.

For printing lake:

8 liters Discharge blue standard M.N.
2 liters Stannous chloride solution 120 degrees Tw.

Discharge Yellow M.N.

Standard: 550 grams Water
200 grams Lead nitrate
150 grams Light British gum
150 grams Tartaric acid

1050 or 1000 when finished.

Boil and cool.

For printing:

7½ liters Yellow standard M.N.
2½ liters Stannous chloride solution 120 degrees Tw.

10

Discharge Green M.N.

5 liters Yellow standard M.N.
2½ liters Blue Standard M.N.
2½ liters Stannous chloride solution 120 degrees Tw.

10

The foregoing colors are to be printed on cloth that is dyed Manganese brown. They are then to be dried gently, at as low a temperature as possible, so as to avoid tendering the fiber, and then they are hung in a cool room for a few hours. While the goods are hung the stannous chloride, which is a reducing agent, reduces the hydrated peroxide of manganese to the manganese oxide, and this is dissolved by the acid present, forming a soluble tartrate, which in its turn, is subsequently dissolved out of the cloth and washed out, leaving a white or a colored pattern as the case may be. When the cloth has hung a sufficient length of time to let the ground color become completely discharged it is taken down and thoroughly washed in a large volume of completely cold and clean water and treated to a chalk and water bath—15 to 20 grams per liter of chalk—and then run in a chrome bath of 1 per cent of bichromate of potash (or soda) at 40 to 50 degrees C. to develop the blue, yellow, and green. As a final thing, wash well and dry.

Before the coal tar colors were known the foregoing yellow, green and blue, and a Brazil wood pink, were the only colors that could be used as discharges on a Manganese brown. Since the basic coal tar colors came into the market they work well as discharge colors, however, and are much used in place of the foregoing; they are much brighter and of greater variety, of course.

BASIC COLOR DISCHARGES ON MANGANESE BRONZE

	Blue	Red	Pink	Yellow	Green
New Methylene Blue N...	25	...	...	...	...
Rhodamine 6G extra.....	...	25	10	...	...
Auramine O	...	5	...	...	...
Thioflorine T	...	...	...	20	...
Brilliant Green	...	...	...	...	13
Auramine G	...	...	...	...	20
Acetic acid 9 deg. Tw...	175	170	175	175	175
Tartaric acid	100	100	100	100	100
Water	190	50	105	155	142
Tragacanth 6 per cent...	100	100	140	100	100
Starch	100	100	120	100	100
Tannic acid sol. 50%....	160	300	200	200	200

In printing: 850 grams Standard given.
150 grams Stannous chloride (crystals)

1000

Dissolve in the cold. Print on dyed cloth (manganese)—dry, hang, wash and chalk as before. Don't chrome. Wash well and dry as before. It is best to carry out the various washings, etc., at the full width of cloth so as to avoid all chance of marking off.

The manganese style is, except for a few styles, extinct at the present time, and its place has been largely taken by the Para brown and its discharges.

[This is the tenth and concluding article of a series of articles on "Machine Calico Printing."—The Editor.]

Some interesting changes have been embodied in the "Centrif-Air" adjustable cotton cleaning system, manufactured by The Centrif-Air Machine Co., Inc., Atlanta, Ga., which was originally described in the December, 1924, issue of Cotton. The cleaning portion has been re-designed, so that now as the cotton passes through the work arms, it is thrown upward into a high open top, for the purpose of opening it more thoroughly than where it was closely confined. The section containing the series of work arms has been changed so that it now embodies a large square box-like space above the arms into which the cotton is thrown, and aerated. Also, it is pointed out, the cotton slows down, so that the work arms exert a continuous whipping action, and that by being opened more thoroughly in the top, the dirt, etc., is loosened from the cotton, resulting in a more intense cleaning. The passage of the cotton through the cleaner, and the actual degree of cleaning, is governed by a series of pivoted vanes in the side of the top portion. By turning a hand wheel, these vanes can be set so as to subject the cotton to any desired machining to give the required cleaning. As a result of the centrifugal force set up by the work arms, it is stated, all hard substances heavier than the cotton leave the cleaner below the level of the opened cotton, are traveling at a much higher speed and present a smaller area upon which the air can act, so that the separator may be adjusted whereby the air will lift the light, slow-moving cotton and allow the heavy, fast-moving materials to strike the baffle and be deflected to the floor.

Scientific Trends with a Textile Slant

The Tools.

Economic. Ambition, lacking positive knowledge of the world's gains and its lessons of the laws which govern economic relations, is but half a step. There is, probably, no more glaring instance of wastefulness than presumptious repetition of methods long discarded as unfit.

We recall the comment of an old experienced mill superintendent, one of those "old boys" trained in the hard apprenticeship of Old World conditions. Discussing a certain phase of "paper management" he disposed of it thus: "The man's a fool, that system was discarded in Germany fifty years ago, because it defeated its own ends, was more wasteful than ordinary waste itself."

In this country technical skill has risen to mighty proportions. Yet the cornerstone of it, as it is effective, must be, ever, sound economic principles, applied, concretely, to each specific problem that arises.

Culture. Not as one who raises his voice for culture, for its own sake, merely, but considering it as a practical matter—most men go on the rocks of bad decisions unless their background is founded upon a breadth of view which embraces wide sympathies and understandings.

Knowledge of the sequence in which facts are likely to and do happen is one of the chief benefits of culture.

The case for culture is overwhelming when we appreciate the efficiency with which historical sequence, in events, motives, and dynasties moves on. Perhaps all things are not built in cycles, although there is much evidence pointing to that as a fact. At any rate, *until we can control destiny* it is not well to neglect those records of the past.

Engineering. Three things are the bases of our engineering today. The principles of pure science govern the laws with which we work and which we convert into formulas for field operations. Structural and organic materials furnish us the means of *applying* these principles to a concrete result. We apply these principles, subject to the peculiarities of the several materials to be used, and develop methods of procedure. This "technique" is the fusion of the other two.

Three things, then—"yea a fourth," if you are to make your engineering "stick":

"My son, get wisdom, and with the getting get understanding."

Management. Troubles persist, in employee relations, because of incomplete realization of the social basis of work. The association of workers, in a group, can not be divorced from their contact as people.

It sounds simple enough, yet there are many evidences of need of an economic restudy of this whole situation if a congenial atmosphere in work is to be maintained. Some

We can not help being impressed by the frequency with which discussions of ways and means to improve a condition or to correct an evil end with the statement: "Ultimate success must come through education." Tacit admission, this, of the place the forces of instruction hold in the scheme of our well-being and more—this is the text upon which to base our scheme of raising the general standard of intelligence.

As this writing is printed the plans of the year's work in our schools are formulated and in process of application. Nevertheless, it is fitting to mention some of the factors of these and future plans which will give us the objective of improved conditions and achivements, in an industrial way, which we desire. In order that this may come about we must strike a practical-cultural balance, especially if instruction is to furnish and be the precursor of effective industrial life.

Certain major factors must be coordinated, balanced, and applied. Certain additional resources of wealth must be drawn upon in order to:

"Make possible, make real,
"The dreams men dimly feel.
"Prepare, enrich the soil;
"Perfect the tools, that toil
"Be free, be unharnessed,
"Its day of drudging past."

light is being thrown upon this matter from another angle. Recently, an engineer of note has attocked the problem from another angle, applying mathematical deduction and scientific analysis to the whole matter. The outcome of these investigations promise to be fruitful, as pointing out a method of attack that is fundamentally sound and precluding controversy.

Technical control, with its many factors, offers many benefits and aids to management. Its ease, reduction of friction, economy of operation, promotion of uniformity, etc., are not to be overlooked hastily. Above all, it affords unlimited opportunity for far-reaching study and improvement of conditions, processes and functions. That, after all, is the keynote of most of the benefits education and training can give to us in industry.

The Objectives.

Progress. Whatever of advancement we may register as our contribution to our industry and our age it will be measured, and limited, by the height to which our plane of thought rises and functions.

We are convinced that *mental attitude* registers the keynote of progress. To submit to little, temporary (?), successive letdowns is to fail, miserably, of great achievement. Great creations are associated with the Ideal of Perfection. Only by this means will come, ever, contributions worthy of our age, of our opportunities.

"Who labors, wins—by forge or pen,
"By plow or loom or song—the men
"Who spend themselves, their best,
"Find in the spending zest."

Invention. Whether it be in method, process or equipment, or in a coordination of all three, invention is achieved through a sequence of efforts which must be adhered to.

Modern invention is made efficient by a careful and rigid analysis of the problem. Specification follows this as logically as day does night. It is important that the specification be of an order, a height, sufficiently great to justify the effort of inventiveness being put forth. (Most inventing that has not paid has failed in this particular.) Do not assume that this or that "Can't be done." Set it down to do—let the expert find the way. That's what you're paying him for anyway.

Then comes the delicate and skill demanding stage—that of the assembly of *facilities* to bring the work to success. All influences which have any bearing whatever upon the matter must be considered in this stage.

As the sculptor is to the marble so is the inventor to this array. He it is who will reject this, keep that, modify that, until the lasting creation is unveiled before our appreciative eyes.

Artistic. And then we get very close to that desirable

condition where the useful is beautiful and the lovely is the most effective. This is a most logical sequence of good invention.

To this end be it remembered that the true background of inspiration is in the attitude of mind, that it be receptive to harmonious impressions, so that it will reject, instinctively, that which jars or offends. Ultimate judgment of machine detail as well as the work of the brush must pass this censor, never forget it. Decision, determination, once the plan and body of the creation are before the mind's eye, are of just as much importance here, as they enable the worker to bring his fabric through to rounded perfection.

The artistic has been present in all great achievement. It is indissolubly bound up with it in every creation of a far-reaching nature. How could it be otherwise—for such productions, like a great canvas, were fundamentally imaginative.

Towels and Toweling

BY T. WOODHOUSE AND A. BRAND

Terry pile weaves are comparatively few in number; they are designated 3, 4, 5 and 6-pick terrys, according to the number of picks of filling required to form one horizontal row of loops. As a general principle, it is only necessary to insert two loose picks in succession, and follow these by any reasonable or desired number of fast picks in order to produce a terry weave.

The loose picks are:

(1) The last pick of the float which forms the pile loop, and

(2) The succeeding pick which binds the pile warp

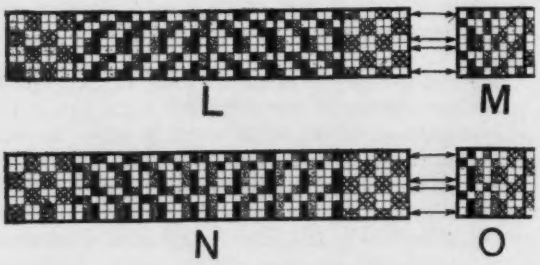

Fig. 97.

with the filling. (See Fig. 90, page 570, April, 1925.)

The fast picks, i.e., those which are beaten up with the reed in its full forward position, form the ground portion of the fabric. The number of fast picks in the unit is determined by

(1) The degree of firmness with which it is required to bind the pile loops into the body of the fabric, in order to prevent "pulling," and

(2) The necessity of producing heavier and firmer textures.

Although a firmer fabric is produced by increasing the number of fast picks, it is well to remember that the density of the pile or the number of horizontal rows of pile loops per inch will be reduced unless the number of picks per inch is proportionately increased.

In 4-pick terry weaves, two methods of interlacing the ground warp with the filling are commonly employed. Both these methods are illustrated in Figs. 97 and 98; the former gives the point paper designs and weaving plans, while the latter shows the intersections. In both figures the designs, etc., are conveniently arranged for comparison.

The pile threads in both structures interweave in exactly the same order. Each unit of the weave contains two pile threads; one of these interweaves in 3 up 1 down order throughout, while the other works exactly in opposition, i.e., in 3 down 1 up order. The former thread forms the pile loop on the face of the fabric, while the latter forms the corresponding loop on the back of the fabric.

It will thus be seen that the difference between the two cloths lies in the method of interlacing the ground threads. In one cloth the ground threads work in 3 up 1 down and 3 down 1 up order, but in a different position to the pile threads. In the other case, the ground threads operate in 2 up 2 down and 2 down 2 up orders.

The 2 up 2 down and 2 down 2 up order of ground weave together with the common order of pile interlacing is illustrated at L, Fig. 97, where the warp yarns are arranged as under.

1 pile thread
1 ground thread } for the left-hand half, then—
1 ground thread
1 pile thread } for the right-hand half.

It will be understood that the first order of warping extends to the middle of the fabric, and the second order for the remaining half.

The complete design L, Fig. 97, including the basket selvage weaves, is arranged to suit the draft B, Fig. 95, and

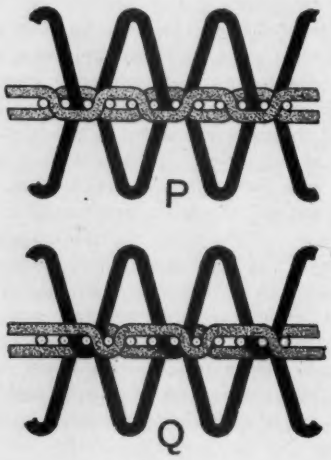

Fig. 98.

M, Fig. 97, is the corresponding weaving plan. The fast picks are again indicated by double-headed arrows.

The 3 up 1 down and 3 down 1 up order of ground weave with its pile threads is illustrated in design N, Fig. 97, and the corresponding weaving plan is that at O.

Intersections of the two fabrics produced by the two methods are given at P and Q in Fig. 98. The upper intersection P illustrates 4 threads and 12 picks of design L, Fig. 97, while the lower intersection Q corresponds to 4 threads and 12 picks of design N, Fig. 97. In both sets of designs and weaving plans in Fig. 97 it should be

noted that two units or repeats in the way of the filling are shown in each case.

When the 2 up 2 down and 2 down 2 up order of ground warp interweaving is adopted it is possible to decrease by two the number of harnesses suggested in draft B, Fig. 95. Examination of the design L, Fig. 97, will show that the 10th and 12th threads (counting from the *right*) are ground threads, and that they are respectively the same orders of weaving as the 1st and 3rd threads, which are selvage threads. It is therefore possible to dispense with two of the selvage skeleton harnesses, by controlling the right-hand selvage threads by the two ground harnesses.

If this same selvage—the 2-and-2 basket or matt effect—is required with the 3-and-1 order of interlacing the ground warp, all the 4 selvage harnesses are still necessary.

In every case special arrangements must be made for the controlling of the extreme selvage threads, in order that a satisfactory selvage can be made. The necessity for such special provision is best seen in the designs L and N, Fig. 97. In the terry portion only of design L, it will be found that the first and last picks of each repeat are identical with each pair, while in design N, in each repeat, the first pick is exactly similar to the second pick. Catch-bands, or catch-cords, as they are sometimes termed, are often used in these and in analogous cases, but, in the present circumstances, it is preferable to adhere to the use of the basket weave throughout, and to arrange the picking from each side of the loom to synchronize with the order of shedding in a particular manner. With the designs arranged as in Fig. 97, the first pick in each case should be inserted with the shuttle traveling from left to right; this order results in a perfect selvage. Some care, however, is necessary in connection with fabrics in which the ground weave and the selvage weave occupy different numbers of picks, especially when the loom is re-started after picking back to repair a broken pattern or for any other reason; in such cases there is a danger of the proper sequence of shedding and picking being lost.

By the insertion of 4 picks instead of 3 picks for each horizontal row of pile loops, the 4-pick terry is correspondingly firmer in structure than when the 3-pick terry weave is employed. There is, of course, as already mentioned, a decrease in the density of the pile, unless this is compensated for by any of the following methods: (a) By increasing the number of picks per inch. If all the other particulars remain as before, the pile can be maintained by increasing the number of picks in the ratio of 4 to 3.

(b) By using a heavier count of pile warp. It would be possible to retain by this method the same weight of pile yarn on the surface, although its distribution over the surface might not be so good as in the 3-pick weaves.

(c) By increasing the length of the pile loop. This would increase the ratio of pile warp length to ground warp length. It would again be possible to maintain the weight of pile on the surface, though, as before, the equality of distribution would probably suffer.

(d) By increasing the sett of the warp. This would give a greater number of vertical rows of pile loops per inch of width, but might increase barriness.

(e) By combinations of two or more of the above methods.

It will be noticed that the first method (a) is the only one which retains the original distribution of the pile loops.

The 4-pick terry is sometimes employed in preference to the 3-pick variety in the manufacture of towels, toweling, bath-mats, etc., which are ornamented by simple counter-change stripes and blocks of terry loops, developed with the aid of colored pile warp. With the 4-pick weave, it is possible to obtain a sharper outline on the horizontal edges of the pattern, i.e., where the pile loops change from face to back or vice versa.

Five pick terry fabrics are usually woven with both pile and ground warps interlacing in the order $\frac{2\ 1}{1\ 1}$ and arranged as shown at S, Fig. 99. Four units or repeats are here indicated, two in the way of the warp, and two in the way of the filling. The fast picks are indicated by arrows, the warp is arranged in the order 1 thread pile, 1 thread ground, and the weave itself requires 4 harnesses. This design may be, and is, regularly used for the production of certain grades of terry toweling, but the 5-pick terry weave, or, rather a modification of the form shown at S, finds its chief application in the manufacture of jacquard-

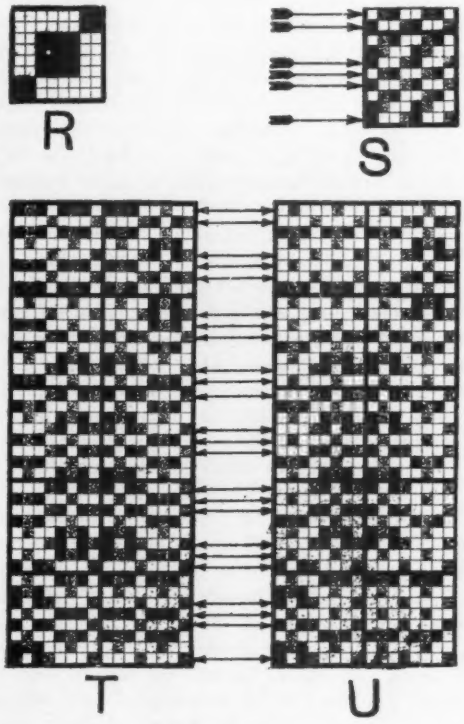

Fig. 99.

figured terry fabrics for use as bed-covers or counterpanes, furniture cloths, toilet-covers, antimacassars, etc. A brief explanation of this modified form should be of interest.

Special jacquards are constructed firstly to facilitate the preparation of the required designs which consist of a figure of terry loops upon a plain ground, and, secondly, to minimize the cost of production. The designs are prepared *en bloc*, that is to say, they consist of solid masses of painted and unpainted areas, on neither type of which is any weave structure shown. These designs are similar in appearance to, but more elaborate usually than the small motif indicated at R, Fig. 99. In weave S, Fig. 99, two different orders of interweaving the pile threads are em-

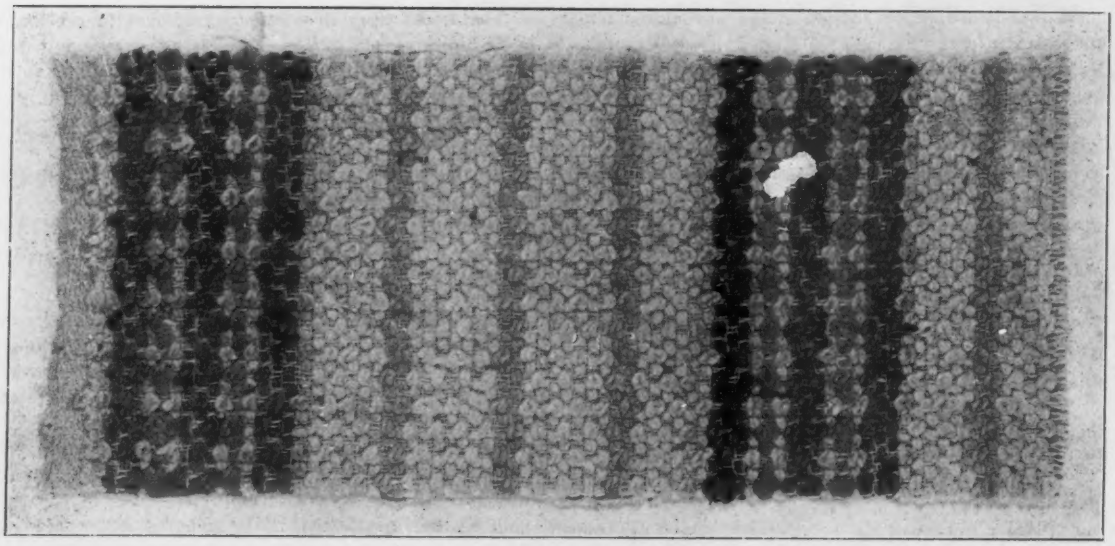

Fig. 101.

ployed, in order that terry loops may be formed on the face and on the back of the cloth simultaneously. In the modified design, all pile threads also loop simultaneously, but the loops are all on the face in the figure portion, and all on the back in the ground portion of the fabric. A considerable variety of fabrics is made by these modified designs.

The structure of a portion of a cloth corresponding to the motif R, Fig. 99, is worked out at T in the same figure. The block design R is on 8 x 8, and thus represents 64 loops. The filled in squares represent loops on the surface, while the blank squares indicate loops on the back. For its complete formation, each loop whether on the face or on the back, requires 2 warp threads (1 ground and 1 pile) and 5 picks (3 fast and 2 loose). The total numbers of threads and picks necessary to produce the motif R are:

$8 \times 2 = 16$ warp threads, and
$8 \times 5 = 40$ picks of filling.

The structural design T is therefore complete on 16 threads and 40 picks. It shows that all ground warp threads work exactly as in the orthodox 5-pick terry design S, and that all pile threads work exactly alike where the loops are to appear on the face of the fabric, while they work exactly oppositely when the loops are to appear on the back. The use of the above-mentioned special jacquard greatly simplifies the operation of card cutting, as well as the preparation of the design. In preparing the necessary cards, it is only necessary to cut holes corresponding to the entire figure portion of the block design, and to leave uncut the whole of the ground portion.

When making such figured fabrics, a modified form of the structure T is sometimes employed, particularly when it is desired to insert a large number of picks per inch. This modified form is given at U, Fig. 99, where it is used to work out the structural design for the motif R, and is thus directly comparable with the structural design T.

It will be seen that all the ground threads throughout the fabric, and all the pile threads, where they loop on the face of the fabric to form the figure, work exactly as in the structural design T. The difference in the two structures lies in the method of interlacing the pile warp threads where the loops are to appear on the back of the fabric, i.e., in the ground portion of the design. Here it will be seen that the pile threads interweave in 1 up 4 down order.

No modification of the block design is required, but it is necessary to instruct the card cutter to the effect that the pile threads, when they loop on the back of the fabric, are to be lifted only on the 2nd loose pick in each repeat of 5 picks. The cloth thus formed gives a less secure interlacing of the pile warp with the foundation fabric in

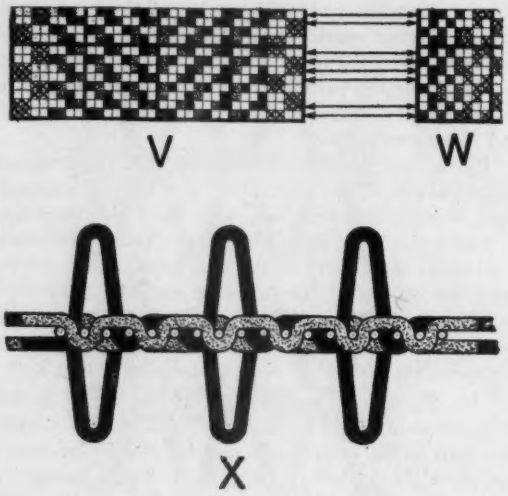

Fig. 100.

the ground portions of the design, but the reduction of the number of intersections per unit weave facilitates the insertion of larger numbers of picks per inch.

Several 6-pick terry fabrics are regularly made, the best known one of which is that made by Messrs. Barlow & Jones, Ltd., and sold under their trade name of "Osman." It is similar, indeed practically identical, in design, draft illustrated in Fig. 95. The control of the terry motion, or, rather, the order of inserting the fast and loose picks, is, however, totally different, there being 4 fast picks followed by 2 loose picks in each group of 6 picks.

(*Continued on page* 1252.)

Some Yarn Mill Wastes

BY R. A. SONIAMAN.

IN THREE PARTS. PART ONE.

Spinning Waste.

Before we take a stroll into the spinning room, let us refresh our memories with the different types of waste that we will meet with. Following your suggestion to take into consideration only the waste that cannot be reworked again by the mill, we find that ring spinning waste can be classified somewhat as follows: Singles, Doubles, Cockled, Pulled, Lumps, Overfilled—rubbed, Slack, Bad bottoms, Band lashed, Oily, Soiled—dirty, Run over top, Run under bottom, Mixed roving, Clearer waste, Wrong direction of twist, Bobbin stripper.

Now, then, armed with this list let us saunter through the spinning room. No, it doesn't make any difference which end we start on. Just a moment! Smell anything burning? It's a band. Once recognized, this peculiar odor can never be dissociated from a cotton band. You'll find that one has broken and become caught around another band holding the latter stationary. Friction of revolving cylinder is heating the band to smoldering point. Ah! Here's the culprit. See! The broken band has lapped itself partly around the bobbin. And look at the mess it has made of the yarn. Soiled; and part of the bobbin is tangled.

Here, then, is one source of waste. A good specific but not a cure-all is a periodic testing of bands, cutting all those which show signs of having outlived their usefulness. And remember, the secret of getting good results from the testing lies in its being carefully followed up. I recollect a certain section-hand who used always to preface his excuses with, "Well, we're supposed to do this—" What is supposed to be done and what is actually done are two things often diametrically opposite one another. You see what I'm driving at?

All right. Let's move along. But before we do, let me look at the bobbin on the spindle that the band broke off. Aha! I thought so. See how much bigger the bobbin is than its neighbors. Feel. Soft as a sponge, eh. Band was slack quite a while evidently. All the yarn on the bobbin is slack. It'll have to go to waste.

This slack bobbin reminds me that we have a bobbin stripping machine around here somewhere. A little story will illustrate the point I'm going to bring out. I was in a mill some time ago, a giant of a concern. In one room, spinning room, there were two bobbin stripping machines. I stopped to look them over. While I was thus engaged, along came two pleasant faced old gentlemen with a canvas skip full of partly filled spinning bobbins. They emptied the basket into a large bobbin dump next to the machines. I looked into it. H'm. Very interesting. I reached in and pulled out two bobbins each half full of yarn. (Fig. 1.) I looked them over. Could see nothing wrong. Strange, I thought.

"Say, Joe," I called to one of the smiling grand-daddies, "what are you going to do with these bobbins?"

"Put 'm all in masheen," quickly responded the amiable old fellow. And to illustrate his point and dispel my ignorance, he filled the raceway with bobbins.

"You do this everyday?" I queried.

"Sure," he responded, looking his surprise at my question. And as I looked around for his partner, that worthy mill veteran was tugging at a basket heaping full of waste that had been stripped from just such bobbins.

"Some money thrown away in this plant," I thought to myself.

The point then is to have somebody look over the bobbins before they are stripped. If any among them contain more than a predetermined amount of good yarn, an investigation is in order.

Better still, have a daily inspection of each spinner's bad bobbins before they are consigned to the stripping machine. And by the way! If the weave room sends back any bad bobbins to be stripped, have someone go over these regularly. Most of the bobbins in the mill I spoke of were filling bobbins that had been returned by the weavers as bad work.

Look at that doffer over there! He's pulled the top right off that bobbin. (Fig. 2.) You'll be surprised at the amount of waste that can be made in this way; for your own benefit, give an occasional glance at the filling boxes on their way to the spooling department or weave shed.

The bobbins may be tight on the spindle, but quite often it is just plain carelessness on the part of the doffers. Spinners, too, are not altogether guiltless in this matter of yanking off the tops of the bobbins. Especially if no one follows up the waste. What's the matter with the section hand, you say? Ah, thereby hangs a tale.

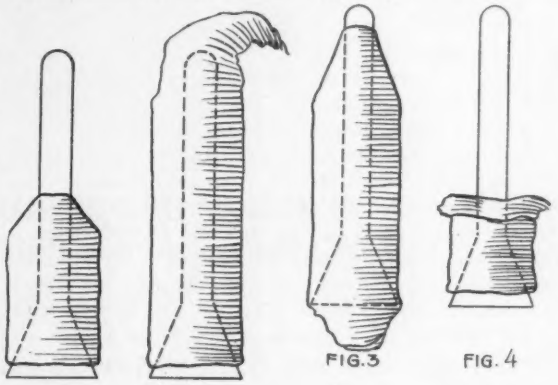

FIG 1. FIG. 2 FIG. 3 FIG. 4

Here's a single. See; that roving bobbin is stationary. Looks like a bunch of fly waste around the skewer point, doesn't it? Wedged right into the skewer step. A careless spinner in wiping her creels is bound to get more or less of the fly waste into the steps.

Look! There is a double running on that side. The spinner's coming along the alley now. She doesn't notice us; let's see what she'll do. There! She is going right along, utterly unobserving of it. And obviously, the longer that double runs, the greater the amount of waste that will have to be pulled off. Spinners often need considerable prodding before they look after this imperfection as they should do, on every one of their sides.

Too heavy a traveler will cause breakages of ends which may incorporate with a neighbor. Improperly set traveler cleaners are sometimes responsible, the traveler growing heavy under the accumulation of fly.

Let's look over some of the bobbins in this doffer's box. This one is filled so near the top that by the time it is dumped into the spooler's trough it will peel over the top, and quite a little yarn will have to be pulled off before it can be run. Bobbins filling over the top get tangled easily when the ends break and several lash together. Three or four more bobbins just like it. A ring rail out of kilter, evidently.

That reminds me. On one of those frames we just passed, a ring rail was running too low. Much waste is sometimes made by bobbins filling over on the bottom (Fig. 3). When there is only a stray here and there, you can safely assume that they were left up at doffing; but if there are quite a number, it is usually a ring rail at fault. The remedy, obviously, is to maintain the rails in proper alignment. Here's the section-hand.

"Say, Jack, there's a rail running low on that third frame."

What are they doffing that half full frame for, over there? Let's have a look. Ring rails stuck. A tangled lump (Fig. 4). Whole doff "shot," the boss doffer is saying. These accidents will happen, but faithful lubrication of the moving parts, and an occasional examination of the gear end and lifter rods by the section-hand will do much to keep them down to a minimum. Another thing! Brooms, mops, boxes, as well as other odds and ends, should be persona non grata under the spinning frames If they get underneath the lifter rods or weights, a lump on the bobbin is bound to result.

Did you see that bit of clearer waste slip on to that bobbin like a rum-runner sneaking through a fleet of revenue cutters? Somebody's neglecting to pick the top clearers. That bunch, little as it is, will make waste somewhere. If it gets by the clearer at the spooler, it will show up in the yarn or cloth later on.

Here's a frame ready to be doffed. What's the matter with all those ends that are down? And look at the laps! Pull up some of those bobbins. Just as I thought. The bobbins are too full for the size of the ring. They are rubbing on the ring, holding back the traveler, thereby causing the ends to balloon, and resulting in an entanglement of the adjacent ends. See how the coils are rubbed and tangled. Such bobbins will make more or less waste on the spoolers. The trouble on this frame is that not enough teeth are being taken by the ratchet gear on the builder motion. This is an important point to follow up when changing from a fine to a coarser count.

Those fine yarn frames seem to be running pretty well. You ask why that third bobbin should appear so much bigger in diameter than its neighbors? The band may be slack, making a spongy bobbin. Still the band doesn't appear slack. Press your finger on the spindle jacket. Band's all right. Traveler seems to be right, too. Well, take the bobbin off. Feels firm. Peculiar. Always look suspiciously at these corpulent bobbins—take the attitude of "you're guilty until you prove yourself innocent." Something is usually awry.

Let's see. This frame's on Egyptian, isn't it? That's a brown colored cotton. This bobbin looks kind of light. Take off another bobbin and we'll compare the shade. Sure enough! The big fellow's much lighter; and what's more, the thread is much thicker than the yarn on that one. A mix! Take out the two roving bobbins in the creel. There you are! A bobbin of American cotton. It's pretty small, probably comes from a frame that has been changed and was accidentally mixed in with the roving for this frame. But where were the spinner's eyes when she put the bobbin in the creel? And where have they been since? Why, that bobbin could be spotted a mile off! Probably she hasn't been taught to look out for a thing of this kind. See to it, then, that your spinners know they must look for and report such mixtures.

Look at the yellow spot on that roving bobbin. Oil! And most likely a mineral oil, too. If you haven't any black goods to put that yarn into, it'll have to go into waste. You say there are drops of oil on the under side of the creel board? Quite right. Look at that overturned oil cup!

I noticed on the complaints from the weave room, that a whole lot of bobbins are being returned as cockled. That very likely means a change in the staple of the cotton, and the setting of the rolls has not had proper attention.

When a mill is making both left and right twist yarn, there is always the possibility when changing a count, of getting the twist in the wrong direction. And the yarn, like as not, may have to be put into waste. Section and second hands should check the twist when a frame is being changed, and spinners should also report when they discover an error of this type.

This little trip through the spinning room has no doubt given you some first hand knowledge of how the waste is made. Obviously, these are not the only waste makers. Excessive speeds, poor roving, high labor turnover, and inexperienced, incapable workers are also big contributors to a mill's waste.

It is perhaps needless to remind you that the total amount of waste in the room should be carefully followed up each week; furthermore, every spinner should be provided with a box in which to put only her hard waste. This waste should be examined periodically to see what is being made. If there is an unusual amount, an inquiry generally discloses the trouble, and a remedy should immediately be applied.

You will also find it to your advantage in handling the waste problem intelligently, to make a test for what may be regarded as the inevitable waste allowance for each count on every ring size you run. Pick out only the best spinners for this test, follow it up carefully, and after the data is complete, try to impress on everybody concerned that the ideal waste percentage for the spinning room should be less than the allowance indicated.

Saco-Lowell Shops have opened a sales and service office in the Healey Building, Atlanta, Ga., which is in charge of Walter W. Gayle. Mr. Gayle, who is a graduate of the University of Alabama and the Philadelphia Textile School, has had charge of the Greenville office of the company for five years. The Atlanta office has been opened, it is announced, for the purpose of giving better service to mills in that special territory which can be more efficiently served from Atlanta. The Greenville office will be maintained in charge of John L. Graves, who has been connected with it for several years. Both offices operate under the supervision of Rogers W. Davis, agent, Saco-Lowell Shops, Charlotte.

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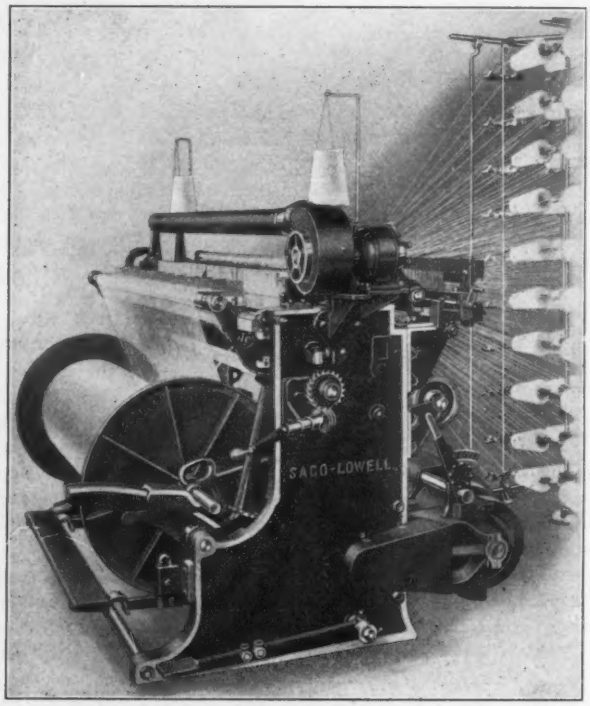

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What the Southern Mills are Doing

Report is to the effect that the Appleton Company, of Lowell, Mass., have purchased the Brogon Mills, of Anderson, S. C. It is stated that plans for enlarging the plant, which now contains 30,000 spindles and 900 looms, are being considered.

Clinton Cotton Mills, Clinton, S. C., have commissioned Lockwood, Greene & Company, engineers, of Atlanta and Boston, to supervise the complete electrification and new lighting system for Clinton Cotton Mill No. 2.

Installation of sprinkler heads at the Valley Falls plant of the Martel Mills, Spartanburg, S. C., is under way, under the supervision of the M. L. Cathey Company, Greenville, S. C.

Kenneth Cotton Mills, Walhalla, S. C., have commisioned J. E. Sirrine & Company, Greenville, S. C., to provide plans and specifications for a new packing and shipping building. The new structure will be in the nature of an addition to the present plant to relieve congested conditions in the weave room building. It will be 40 feet square, one story in height, and of slow burning mill construction.

The machinery of the Lullwater Manufacturing Company mill at Greenville, S. C., is being removed to the main plant at East Point, near Atlanta, Ga.

Cherokee County Cotton Mills, Kings Creek, S. C., have been organized with a capitalization of $100,000. A. W. Love is president and treasurer, W. M. Faulkner is vice-president, and W. A. Love is secretary.

Piedmont Plush Mills, capitalized at $225,000, have been organized at Greenville, S. C., and will erect a plant for the manufacture of plush and similar goods. J. E. Sirrine & Company are the architects. The machinery has been ordered, some of it from Germany, and is expected to arrive shortly. Plans for the buildings call for a main structure, one story in height, of brick and steel construction, 181 x 90 feet. A dyehouse and boiler room also will be erected on the premises. Fred W. Symmes is president and treasurer; Clifton Corley, formerly president of the Vardry Mills at Greenville and the Corley Mills at Cumberland, N. C., is vice-president and general manager; and C. E. Hatch is secretary. The board of directors include, in addition to the officers, J. E. Sirrine, Aug. W. Smith, B. E. Geer and W. F. Beattie.

A mill to manufacture waste yarn and mops will be built at Granite Falls, N. C., by A. A. Shuford, manager of the Shuford Mills Co., Hickory, N. C. The size of the building will be approximately 100x400 feet, it is stated, two stories in height. An addition to the A. A. Shuford Mill company plant at Granite Falls will be made also, it is understood.

Balfour Mills, Balfour, N. C., have let contracts covering the building and equipment for a new 120 kva. steam electric power plant. The new plant will be in close proximity to the mill, and is of sufficient capacity for the contemplated future extensions to the mill. Electric power will be generated at 3-phase, 60 cycles, 600 volts. The building will be 53 feet by 72 feet with outside walls of concrete and brick. The floors will be reinforced concrete and roof of tile finished with 5-ply tar and gravel roofing. All equipment will be modern and highly efficient. J. E. Sirrine & Company, Greenville, S. C., are preparing the plans and specifications covering the building, equipment, etc. Contracts that have been let are as follows: buildings, Fiske-Carter Construction Co., Greenville; turbo-generator, General Electric; condensing equipment, H. Wheeler Mfg. Co.; boilers and superheaters, Babcock and Wilcox Co.; stokers, Combustion Engineering Corp.; soot blowers, Diamond Power Specialty Corp.; chimney, Alphons Custodis Chimney Construction Co.

Kendall Mills, Paw Creek, N. C., have let contract to the Gaston Construction Co., Gastonia, N. C., for the erection of 18 new houses at their plant. The company is making numerous other improvements, the work being done under the supervision of Lockwood, Greene & Co., engineers, at a total cost of around $100,000.

Proximity Manufacturing Company, Greensboro, N. C., have awarded to Fiske-Carter Construction Company, Greenville, S. C., the contract for a new roof on the White Oak Cotton Mills weave shed, and for the addition to the Proximity Print Works. The plans and specifications were drawn up by J. E. Sirrine & Company, engineers, Greenville, S. C., and contemplate doubling the capacity of the print works. The new construction work will be of reinforced concrete.

The Adams Duck Mills, Macon, Ga., will rebuild the portion of their plant recently destroyed by fire.

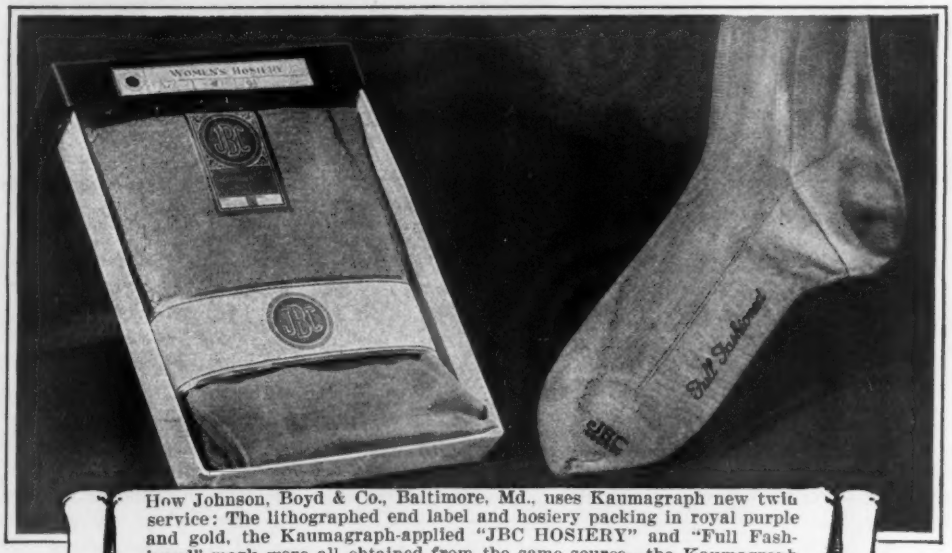
Contract for the erection of a new building for a rug department of Valley Mills, LaGrange, Ga., and a cloth room addition to the Elm City Cotton Mills, LaGrange, have been awarded.

Georgia Webbing and Tape Co., Columbus, Ga., have let contract to Grinnell Company for the installation of a complete sprinkler system for fire protection in their mill building.

Lavonia Cotton Manufacturing Compony, Lavonia, Ga., are making additions and improvements to their plant at Lavonia, Ga., which will consist of a new raw stock dye house, cotton storage warehouse, additions to the fire protection system, and a new air conditioning system. The new dyehouse will be 50 feet wide by 66 feet long, one-story in height and of slow burning mill construction. Standard construction will be used for the warehouse which will consist of two compartments 50 feet by 100 feet. It will adjoin the present warehouse building. One compartment of the present warehouse will be re-vamped for an opener room. Automatic sprinklers will be installed in all the warehouse compartments and dyehouse. In addition, a 50,000-gallon tank will be erected. Improvements in the main mill will be in the form of a new air conditioning system. J. E. Sirrine & Company, Greenville, S. C., have been commissioned to prepare complete plans and specifications covering the building, machinery layout, wiring, process piping, heating, etc.

N. S. Perkins and associates, Anniston, Ala., will erect a weaving mill for producing material for bathrobes, it is understood. The buildings will be of brick and concrete construction. Phillip Noble, of Nashville, Tenn., is among those associated in the new enterprise.

The general contract covering the erection of the new building for Central Franklin Process Company, Chattanooga, Tenn., has been awarded to Gallivan Construction Company, Greenville, S. C. The building will contain approximately 41,000 square feet of floor area, and will



How Johnson, Boyd & Co., Baltimore, Md., uses Kaumagraph new twin service: The lithographed end label and hosiery packing in royal purple and gold, the Kaumagraph-applied "JBC HOSIERY" and "Full Fashioned" mark were all obtained from the same source—the Kaumagraph Company.

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Melville Shoe Corp.
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be of slow burning mill construction with brick walls and steel sash windows. Part of the building will be two stories in height. Plans and specifications were drawn up by J. E. Sirrine & Company, engineers.

The New England Mill Situation.

New England mill conditions are improving slowly. There appears to be a firmer determination manifested on the part of mill owners and managers to meet a difficult situation by firmly resisting the imposition of any more legislative handicaps on industry and by adopting new selling and producing methods where they seem to be necessary. The work of instilling a greater degree of loyalty to the manufacturing institutions of the section appears to have gained force and it is gradually achieving tangible results.

In Rhode Island, Labor Day week was given over to displays of state products in stores everywhere, to addresses on the industries themselves, and to a very successful exhibition of textiles in the Old Slater mill of Pawtucket, the oldest mill in the country, and now used as a museum of historical exhibits of the development of cotton manufacturing in the United States. The displays were astonishing in their variety, notably in textiles. The state is a center of the fabric finishing industry, of cotton, woolen, silk, and rayon production, and of many phases of artistry and designing. Some of the textile machinery products are known all over the world.

Radical changes are being made in the products of various mills and new methods are being tried out to broaden their sale. Some Connecticut mills that formerly made cotton goods only, now make either silk and cottons, or rayon and cotton exclusively. They are producing very highly styled merchandise selling all the way from 32½ cents to 75 cents a yard. Some of the new goods have appeared on the markets while others are being prepared for late showings for the Spring trade. To facilitate the sale of these highly styled novelties, more direct connections are being established with New York selling agencies, and smaller orders are being accepted to be filled promptly.

Cotton manufacturers are not very hopeful of a long sustained profitable distribution of staple cotton goods so long as cotton rules around 25 cents a pound. They have ceased to hope for any early cheap cotton and are not willing to buy ahead very freely. They feel that it has been demonstrated that it is impracticable to distribute standard staple cotton goods at a sustained profit to the extent of the producing capacity so long as silks, rayon mixtures, and worsted goods are so attractively priced. They have every confidence that there will be a market for some part of the output, but on many goods, where competition with lower cost production in the South is met, they do not expect to make much money in the near future.

There has been a much better business of late on 4-4 bleached cottons but it has been done by a few large bleacheries and not by the average small finishing plant. The piece dyed business is still rather limited, although of late there has been more call for khakis, sateens, and other staples. Black goods have been very slow in all cotton. It is a singular fact that while many cotton goods are now offered in absolutely fast colors, the competing lines of silk and mixtures, seem to have a preference among buyers for linings and other purposes.

The job finishers are still doing barely a 50 per cent average capacity business. Yet some of them are very active in parts of their works on rayon mixtures of various kinds. A great deal of money has been spent on new finishing machinery, and on research work, and the time appears to be at hand when good results from this will be obtained. The job printers are looking forward to a very large printed goods season in spring, 1926. More engraving has been done in preparation for this business than has ever been known before in the history of American printing. Some of it is of the most expensive character, calling for novelty designs and colorings never attempted before in many shops in this country.

The large corporation printers are still doing the lion's share of the printing and converting of fabrics and this has limited the operations of converters who operate through the job finishing plants. The American Printing Company at Fall River did a profitable business for the first six months of the year on printed broadcloths, pongees, vat dyed percales, draperies, and miscellaneous lines. At the opening of the Spring season of 1927 the Pacific mills announced that it was now prepared to print and deliver more promptly and would offer new styles in accordance with the changing demands of the trade. This entails new forms of salesmanship, and production. The Windsor Print Works has been very busy on a wide variety of printed specialties. The Algonquin Printing Company has partially completed the installation of a vat dyeing plant to insure the delivery of the fastest colors obtainable. Other large corporations are changing over their systems of production and selling, all with the purpose of delivering goods in smaller quantities and more quickly than has been possible hitherto.

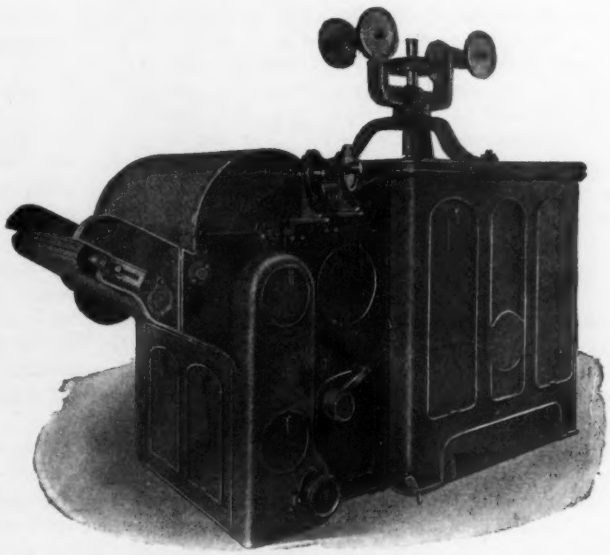
One of the most remarkable changes in the character of production is that made in the Amoskeag Company at Manchester, N. H. This concern has recently separated its financial and manufacturing activities and absorbed the Parkhill Mfg. Co., the producer of the best styled ginghams in this country. The Amoskeag Company will be known as an operating financial company, while the Amoskeag Manufacturing Company will be a manufacturing organization with its own selling agency as at present. The Parkhill products will be sold through Amoskeag channels. The new Spring lines of 19,000 range ginghams and the Hampshire Novelties are the most highly styled and colorful yarn dyed products of a popular priced character ever shown, while new lines of rayon box loom goods have proved to be the most surprising textiles shown in a long time, to be sold at 27½c, 37½c and 47½c a yard, on a 32-inch basis. The initial showings are to be supplemented with new styles as the season's selling goes on.

The large Pepperell mills in Biddleford, Me., are now running in full and are making many new products in sheets, pillow cases, and specialties. During the past month it developed that the inventories of the Hamilton Manufacturing Company at Lowell, Mass., were misleading to the extent of $600,000, so that a reorganization of the properties on a new financial basis has become necessary. The Old Colony Trust Company is financing the notes of the company until the form of new capitalization becomes known. The Appleton Company of Lowell, Mass., has purchased the Brogon Mills, of Anderson, S. C., and

COTTON MACHINERY

NEW MODEL CRIGHTON OPENER

With Cage Section and Apron Delivery



This type of Opener has been used successfully for many years in England and on the Continent. Its superior cleaning qualities make it an ideal machine for working low grade cottons. It has the advantage of adaptability to almost any combination of opening equipment.

The illustration shows a single section "Crighton" Opener complete with Balanced Rope Drive, Cage Section and Apron delivery. Machines are built without the Cage Section and Apron delivery when desired, and installations can be made with one, two or three "Crightons" in a line or section. We furnish these machines with Direct Belt, Individual Motor, or Spiral Gear Drive when desired.

H. & B. AMERICAN MACHINE CO.

Pawtucket, R. I.

Southern Office: 814-816 Atlanta Trust Co. Bldg., Atlanta, Ga.

will operate them as a part of their plant making napped goods. It is probable that the Appleton looms will be devoted largely to fancy products while the Brogon looms will be changed over to the more staple lines that can be made at lower cost than is possible in any mill in New England.

At New Bedford, the mills have been operating to about 80 per cent capacity. Several mills are running almost exclusively on silk and cotton, and rayon and cotton fancies. There has not been much business offering on the more staple lines but good sales of broadcloths, pongees, fine sateens, etc., have been made for printing and converting needs. Specialties in fine yarns have sold but the yarn business as a whole has been unsatisfactory. Mills engaged on special yarns for the tire fabric and other general manufacturing purposes have found business steady but not very profitable. A great many new fabrics of a highly intricate character are being designed and produced on New Bedford looms and more use is being made of silk and rayon than in any other single center.

The Fall River situation shows little change for the better. The narrow print cloth loom mills at Fall River owned by the American Printing Company have been shut down for an indefinite period. The machinery for the new mill of this company in Tennessee has all been shipped and is nearly installed. There are but four mills of this company running here. But the print works has been very active for months.

An announcement made by the board of assessors in that city a few days ago is likely to have far reaching results upon the industry centered there. While the tax rate was reduced $2 per $1,000, the valuations were advanced nearly $30,000,000 and this advance falls almost exclusively upon homes and business institutions in the city, other than those of the corporations engaged in textile manufacturing. It will be recalled that after long litigation, the board of assessors in this city was forced to re-consider its assessments upon the mills, and the city treasury was forced to restore $1,000,000 to the various mill corporations that were overtaxed.

But the expansion of city improvements has gone on and to raise the money required for additional city improvements, it was necessary to re-assess the homes and business property of individuals. The bills for taxes for the year will not be submitted before October 1, but it seems probable that it will awaken the property owning part of that city to the cause of some part of the difficulties that prevent mills from operating profitably, even though they are well equipped, and can sell their product. There are still many mills shut down, and some are running but half time. The policy of saddling the whole burden of taxation upon mills has evidently been abandoned and it remains to be seen how the general public will accept the sudden change that throws the burden on them.

There is no prospect of the Massachusetts 48-hour law being revoked so that investment in mill properties has come to a standstill for the present. But this new attitude toward taxation may help to bring about a better understanding of the unfairness of handicapping a whole industry in a single State, when a reasonable amount of resistance upon the part of those who own their homes and are dependent upon the prosperity of industries would have obviated the action that was taken at the behest of politicians seeking favors from labor unions.

Cotton Comment.

BY H. AND B. BEER.

New Orleans, September 17th, 1925.

Since our last review, the market has worked one way, and then another, making new high and new low price levels thus far this season, now ruling about one cent higher than one month ago.

The irregular trend of values has been due to the large acreage, which, during periods of favorable weather, revived hopes for a large crop, while during periods of unfavorable climatic conditions, such as the last period, September 1st to 15th, prospects for a large production were shattered by the recent heat wave and drouth.

The progress of the growing crop is best described by the semi-monthly government crop returns, which were as follows:

July 2nd, indicated yield	14,339,000 bales
July 23rd, indicated yield	13,588,000 bales
Aug. 8th indicated yield	13,566,000 bales
Aug. 24th, indicated yield	13,990,000 bales
Sept. 8th, indicated yield	13,740,000 bales

The last of government reports was much of a surprise to the trade, as better results were generally anticipated. Meanwhile the recent heat wave and the recent drouth are reported to have played havoc with the crop, especially in Arkansas and Oklahoma, where, until of late, the crop outlook was exceedingly favorable, promising to offset to some extent results of a short crop in Texas. At the moment the disposition is to further revise downward private crop estimates, and the general impression is that the September 23rd government forecast will point to a smaller yield than was indicated two weeks ago by government returns.

Accordingly the market has ruled very strong of late, also because of the continuance of favorable domestic and foreign trade advices, and owing to there being no abatement in the demand for spots in the South, especially for staples, which are reported scarce, due to effects of the drouth, and are commanding big premiums.

The keen demand for spots can be best appreciated when it is realized that, although the present outlook is for a yield of only about the same as last year's 13,628,000 bales exclusive of linters, sales of spot cotton in the South, that is at the 10 reporting southern markets, for the first 45 days of the season totaled 1,357,000 bales compared with 815,000 the corresponding time last season, and at that, the demand last season, in the early part of the year, was anything but poor.

It looks very much as though the trade is prepared to take approximately 15,000,000 bales of American cotton this season, if the cotton can be procured, as aside of the enormous business being put through in spots, exports to Europe are running ahead of last season—from the United States so far 679,000 bales vs. 566,000—and spinners of the world had taken up to last Friday 1,002,000 bales, against 707,000 to even date one year ago when total takings for the whole season were 14,487,000 bales, of which 14,247,000 were actually consumed.

That trade in this country, in textiles, is good is denoted by the fact that American mills, during August, consumed 512,000 bales including linters vs. 402,000 for August of last year. That domestic consumption of raw cot-

The newest in balbriggans

There is no question but that trade in balbriggans is good. But as more and more lines come into the market, price will become an increasingly potent factor.

The one proven method of keeping free of the price difficulty is to impart to a fabric the touch of distinction which will set it apart on a plane of its own.

The simplest and most economical way to achieve this end is to use Celanese. Not the slightest technical difficulty is involved. Any required count may be had. Two-color or multicolor effects may be produced in a single bath. And the beautiful lasting luster of Celanese may be depended upon to distinguish your balbriggans from others.

Celanese dyed with its special SRA dyes is absolutely fast to sun, soap, salt-water and perspiration. Waterproof, highly elastic, remarkably durable, and with unique hygienic qualities. Even in plain fabric no shiners are ever found when Celanase is used.

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ton is likely to remain large, is indicated by the fact that the number of active spindles during August in the United States was 31,270,000 vs. only 29,010,000 last year.

While the September 23rd government report may indicate a smaller crop than two weeks ago, which was 13,740,000 bales, owing to the recent breaking of the drouth in the Southwest occurring rather too late to be reflected in returns, as of September 1st, the fact that Arkansas, Oklahoma and the northern half of Texas, as well as the central portion of the belt, were drenched, makes it possible for better crop results eventually than promised at the present time, also because of the large acreage, unless the cotton region be visited by an early killing frost, but these are remote possibilities, and the trade, for the moment, has to reckon with the present, and not the future, which makes possible higher prices presently.

Towels and Toweling.

(*Continued from page* 1242.)

This order of inserting the 6 picks in each repeat has the effect of interweaving the pile warp much more closely into the body of the fabric, and this, indeed, is the chief reason for this modification. Each horizontal row of pile loops requires 6 picks for its formation, and the cloth is thus relatively firmer in structure than any of the examples previously described. The pile threads are practically immune from "pulling," either through accident or misuse.

Illustrations descriptive of the "Osman" 6-pick terry appear in Fig. 100, where V is the design including 4 basket threads at each selvage, W is the usual weaving plan on 9 harnesses and 12 picks, and X is an intersection through the filling, showing the movements of the 4 different orders of warp threads. The fast picks are again indicated by the double arrows, and the kinds of marks used have the same significance as in the former illustrations of this section. The number of picks per repeat, viz., 12, is necessary because the least common multiple of the selvage weave picks (4) and the terry weave picks (6) is 12.

All the foregoing examples of terry fabrics may be considered as more or less orthodox in design, but there are other special terry weaves developed for particular purposes, often in order to make use of some special class of yarn. A reproduction of a small portion of one of these special terry fabrics appears in Fig. 101. It is a fancy striped fabric made from cotton yarns throughout; the ground warp and the filling are alike, about 16s count, but the pile warp is considerably thicker, and is probably 4s, both counts of yarn are single. The warp is drawn in the order 2 pile, 2 ground, but the pile threads are drawn double, that is, two pile threads in each mail of the pile harnesses, so that the fabric is double-warp as regards the pile warp, and single warp as regards the ground threads. It will be understood that each double pile thread is separated from its neighbors by 2 single ground threads.

The order of the pile warp, in terms of double threads, is as follows:

Cream	1 1	These double threads form the ground of the design, which is in basses or broad stripes, each about 2⅝ inches wide.
White	6 7 7 6	
Ecru	2 2 2	
Grey	3 3 3	These double threads form the stripe proper, which is approximately 1 3/16 in. wide.
Cream	1 1 1 1	
Blue	1 1	

In the finished fabrics there are about 48 warp threads per inch, and about 30 picks per inch of filling.

The design is complete on 6 threads and 10 picks as shown at A, Fig. 102, where 4 repeats (2 in the way of the warp and 2 in the way of the filling) are indicated. The 6 warp threads embrace 2 double pile threads and 4 single ground threads, while the 10 picks are inserted in the order 2 loose, 3 fast, 2 loose, 3 fast, as indicated by the arrows at the left of the design A.

The terry portion only is capable of being woven on 4 harnesses with the weaving plan Z, Fig. 102, and the corresponding draft Y. In this draft, the pile threads are carried on the front two harnesses, following the usual practice. Extra harnesses would be necessary for the basket selvage threads, seen at the left of Fig. 101.

The following particulars are obtained from the cloth

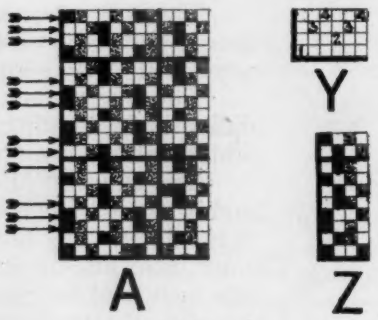


Fig. 102.

by the usual methods. From a sample 2⅞ inches long, a withdrawn ground thread measures 3⅛ inches, while a withdrawn pile warp thread measures 4¾ inches. The length of the ground warp for the production of each 100 yards of cloth is therefore—

$$100 \text{ yards} \times \frac{3\frac{1}{8} \text{ in.}}{2\frac{7}{8} \text{ in.}} = 100 \times \frac{25}{8} \times \frac{8}{23} = 108.7 \text{ yards.}$$

The length of pile warp for each 100 yards of cloth is—

$$100 \text{ yards} \times \frac{4\frac{3}{4} \text{ in.}}{2\frac{7}{8} \text{ in.}} = 100 \times \frac{19}{4} \times \frac{8}{23} = 165.2 \text{ yards.}$$

The ratio of pile warp to ground warp is—

$$\frac{165.2 \text{ yds.}}{108.7 \text{ yds.}} = \frac{1.519}{1} \text{ or, say, 1.52 to 1}$$

This is a small ratio, but such a small ratio is necessary where, as in this case, the pile warp is composed of heavy, softly-twisted yarn.

(*To be continued.*)

The acquisition by Ciba Co., Inc., Cedar & Washington Sts., New York City, of the Aniline Colors & Chemicals Co., Inc., has been announced. The re-establishment of the Chicago and San Francisco branches of Ciba Co. will be effected by this merger, the former offices of the Aniline Colors & Chemicals Company being utilized, with increased laboratory and service facilities. These will be under the direction of J. B. Jones, former president of the Aniline Colors & Chemicals Company.

J. Alfred Lechler, formerly general manager of the Valley Mills, LaGrange, Ga., has become manager of the southern office of the Massasoit Mfg. Co., with headquarters at 718 Johnston Building, Charlotte, N. C.

NOTES ABOUT MEN YOU KNOW OR KNOW ABOUT

B. B. Gossett, of Charlotte, N. C.; Donald Comer, of Birmingham, Ala., and R. I. Dalton, of Charlotte, N. C., have been added to the directorate of Textile Hall Corporation Greenville, S. C. The directorate now consists of twelve members.

R. O. Roberts has resigned as manager of the Danville Knitting Mills, Bon Air, Ala., and has gone to Dallas, Texas, to become manager of the C. R. Miller mills, it is reported.

A. A. Kirkpatrick, formerly at the Avondale Mills, Sylacauga, Ala., has succeeded Mr. Roberts at Bon Air.

W. D. Lawson has become assistant superintendent and general overseer of carding at the Borden Mills, Goldsboro, N. C. Mr. Lawson recently resigned as superintendent of the Rhyne-Anderson Mills, Troy, N. C.

W. H. Gibson has resigned as superintendent of the Waxahachie Cotton Mills, Waxahachie, Texas, being succeeded by Mr. Peters, who was formerly at the Gaudalupe Valley Cotton Mills, Cuero, Texas. Mr. Gibson now is engaged in the mill supply business in Texas.

J. T. McGregor has resigned as superintendent of the Oneida division. L. Banks Holt Mfg. Co., Graham, N. C., and has become agent at the Stonewall Cotton Mills, Stonewall, Miss.

Forrest B. Gardner, formerly general manager of the General Asbestos and Rubber Company, North Charleston, S. C., has been made manager of the Belton Yarn Mills, Belton, Texas.

J. R. Burke has been made superintendent and local manager of the Gambrill & Melville Mills, Bessemer City, N. C.

A. P. McAbee, formerly overseer of weaving at the Social Circle Cotton Mills Company, Social Circle, Ga., has accepted a similar position at the Beaver Lois Mills, Douglasville, Ga.

B. J. Boddie, superintendent of the Greenville plant of The Lullwater Company, at Greenville, S. C., which is now closed, has been transferred to the main mill at East Point, Ga.

C. J. Ashmore, who until recently was superintendent of the Cascade Mills, Mooresville, N. C., has become superintendent of the Pomona Mills, Greensboro, N. C., succeeding E. S. Ward, who has resigned.

A. C. Finley has resigned as overseer of spinning, and C. M. Coleman is now overseer of spinning and winding at the Grier Cotton Mills, Inc., North Wilkesboro, N. C. J. S. Steelman is overseer of carding; W. P. Carson, master mechanic, and T. A. Finley is superintendent at this plant.

H. L. Holden has become superintendent of the Jennings Mills, Lumberson, N. C.

Samuel Turner, Jr., recently connected with the Victory Manufacturing Company, Fayetteville, N. C., has become assistant general manager at the Mansfield and Jennings Mills, Lumberton, N. C.

L. C. Lovern is now overseer of spinning at the Jennings Mills, Lumberton, N. C. He was formerly connected with the St. Pauls Cotton Mills, St. Pauls, N. C.

Laurence MacKirdy has resigned his position with the American Textile Dye Works, Milwaukee, Wis., to accept the position of overseer of finishing at the Aurora Cotton Mills, Lawrence S. Holt & Sons, Burlington, N. C.

Arthur M. Dixon, treasurer of the Dixon Mills, and assistant treasurer of the Trenton Cotton Mills, Gastonia, N. C., has become vice-president and assistant treasurer of the American Yarn and Processing Company, Mount Holly, N. C., which operate several cotton mills and a mercerizing department. While removing from active connection with the Gastonia plants it is understood that Mr. Dixon's official position there will be retained.

C. L. Walker has been promoted from second hand to overseer of carding at the Social Circle Cotton Mills, Social Circle, Ga. Homer Garrett succeeds him as second hand.

D. A. McIntyre, secretary of the Swift Spinning Mills, Columbus, Ga., died recently at the Columbus hospital, following an operation. He was 34 years of age, and is survived by two sisters.

W. C. Gibson, formerly overseer of finishing at the Swift Manufacturing Company, Columbus, Ga., has become cloth room overseer at the Exposition Cotton Mills, Atlanta, Ga.

J. H. Bagwell has become overseer of weaving at the Hoskins plant of Chadwick-Hoskins Company, Charlotte, N. C. He recently resigned as superintendent of the Red Springs Cotton Mills, Red Springs, N. C.

N. H. McGuire has succeeded M. M. Horton as overseer of weaving at the Echota Cotton Mills, Calhoun, Ga., it is reported.

J. H. Dupre is manager of the Powell Knitting Company, Spartanburg, S. C., which is converting the Model Mill building into a hosiery plant. Mr. Dupre was in the past superintendent of the Perkins Hosiery Mills, Columbus, Ga.

William D. Anderson, Jr., has been made sales manager of the Bibb Manufacturing Company, Macon, Ga., succeeding Charles E. Roberts, who has removed to Florida. Mr. Anderson is a son of the president of the company.

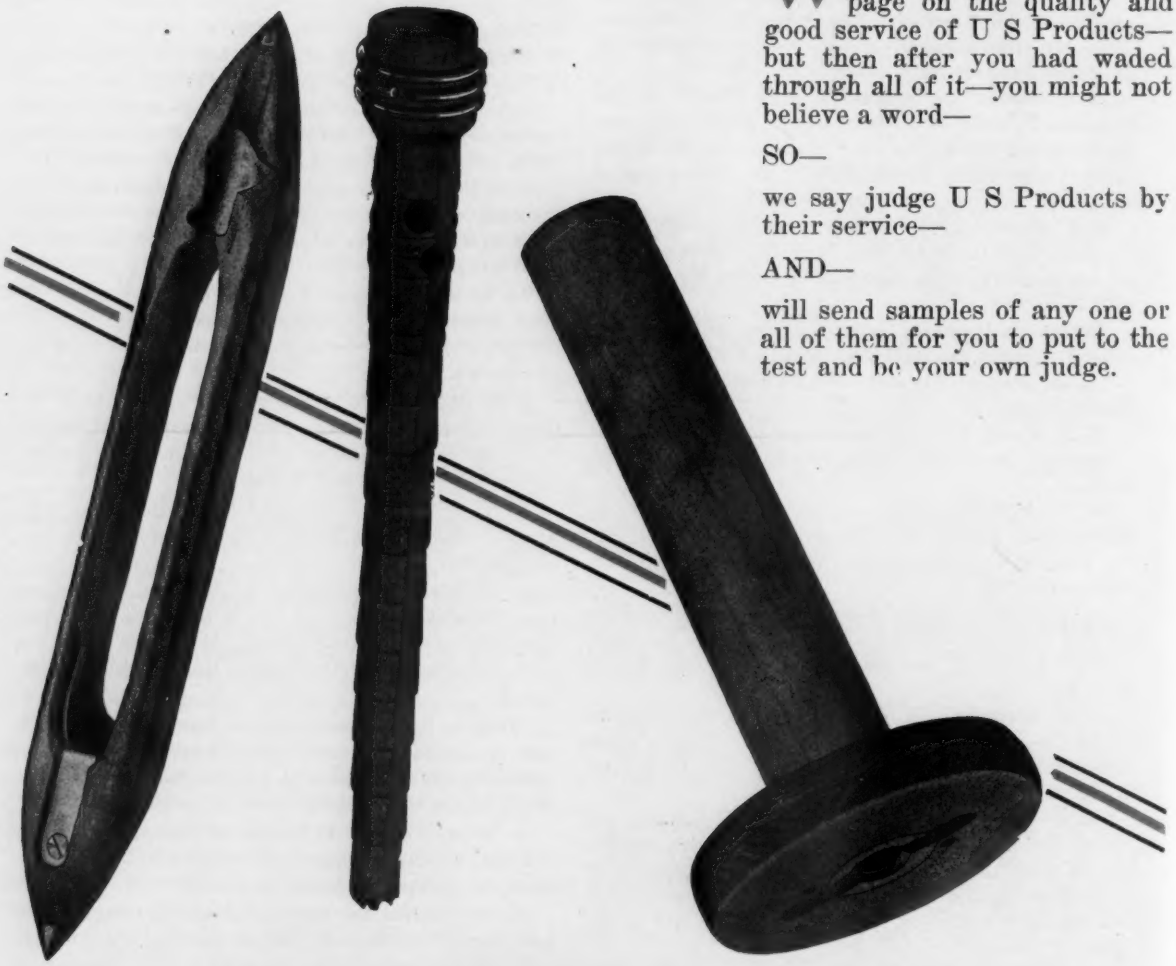
J. Henry Thorpe has resigned as sales agent of the U S Bobbin & Shuttle Company, Providence, R. I. It is understood Mr. Thorpe will engage in business soon for himself.

C. H. Garwood has become overseer of weaving at the Lullwater Manufacturing Company plant at Thomson, Ga.

D. C. Jolley has become overseer of carding at the Orr Cotton Mills, Anderson, S. C.

W. V. Jones has become general overseer of carding and spinning at the Anchor Mills, Huntersville, N. C. He was formerly assistant superintendent and overseer of carding at the Borden Mills, Goldsboro, N. C.

Judge U S Products by their service



WE could write page after page on the quality and good service of U S Products—but then after you had waded through all of it—you might not believe a word—

SO—

we say judge U S Products by their service—

AND—

will send samples of any one or all of them for you to put to the test and be your own judge.

U S BOBBIN & SHUTTLE CO.

LARGEST BOBBIN and SHUTTLE MANUFACTURERS in the WORLD

Eight Factories Providence R.I.

An Old Timer Says

The man who has learned to control himself—the man who is really *master* of himself—well, I claim that he is sure some "rare bird."

Of course you have heard about how scarce hen teeth are, and many other sayings which denote that you don't have to push certain things out of your way as you go out for a walk—but let me tell you that the scarcest "animal" I have been out to look for is the human being who is master of *himself*—the human being who can really control himself.

Yes, I know what many of you are saying right now. "I have been reading 'Old Timer' a long time and he has given me some very good advice, but I sure believe he has slipped a cog this time. What's he driving at anyway? Any man that is much of a man at all can control himself. I don't see anything to that."

Is that so? Well, wait a minute and answer me this one question. *Can you?* And if you answer yes, then I am going to ask you to prove it to yourself before you are too sure about it.

Have you ever gone to a doctor and have him tell you that you were smoking too much, or that you were eating too much meat, or that you were too fat, or any other of a thousand things that you were or were not doing that was not good for your health?

And probably you did not notice that the doctor lit two or three cigarettes while he was talking to you about smoking or that he had a "bay window" on him that was much worse than the one he was telling you about.

How many times have you talked it over with the good wife that you realized you were spending too much of your salary and that you were going to start right now and save so much per week or month? Honest now, how long did you keep it up?

And how many times have you fully made up your mind that you were going to quit smoking or quite chewing or quit "cussing"—and have you really made good on those resolutions?

If you have, you are wasting your time to read any further—and just send in your name to "Old Timer" so he can set you down as one of those "rare birds."

I have been looking for them a long time—in fact, so long that I would be afraid to tell you, because you would surely say that my beard is not as long as it should be for my age.

I can remember very well when I began to realize that I was not master of myself. It was before I was married. I received a letter from my best girl one day, and being very busy I put it in my pocket and forgot all about it until next day.

Then I said to myself I will try that stunt again. So when the next letter came I promptly laid it in my tool box at stopping time and went home. Well, I got along pretty well until I went to bed—when I sure did wish I had that letter. I could think of a thousand things which were or were not in it. I could say over to myself everything I had written her in my last letter and think of "forty-'leven" ways she was going to answer them in her letter.

You, of course, realize that I had a very pleasant night's rest—well, I don't think. Anyway, it was a good lesson for me and brought me face to face with the fact that I was a pretty poor excuse for a man not to have any better control over myself than that.

Now, brother overseer and superintendent, do you begin to see the point I am trying to bring out?

Are you master of yourself?

Don't you remember that time when the boss had you up about your cost and you both went over your payroll carefully—you cut out this man and you made a little change here and there—you got right in behind your production, realizing that every extra pound you got would help bring that cost down, and then how you were all "pepped" up when the boss told you that your cost was the best of any mill he knew of?

No, I am not talking about that *last* time, but the *first* time. Because if you had really been master of yourself there would not have been any *second* time and *third* time and *fourth* time.

How about it?

You also remember that time when you found out all at once that your section men had not been doing anything much for several months except just work enough to get by, and how your production had gone all the way down to the basement, and your seconds were away up in the tower, or your tangled yarn, or your waste, or your supply account, or your black roving was about ten times what it should be, and how you got right in behind those section men and made it so hot for them that two or three of them quit—but finally you kept right after it because the boss kept right after you, and in a few weeks or months you were sailing along nicely?

I say, has that ever happened to you more than *once*? If it hasn't—send in your name.

"Old Timer" has a little book (yes, I said *little* book) he is recording the names in, and there is just plenty of room for yours.

Now after these illustrations, and if you catch my point and do not feel quite so "hefty" as you did when you read the first paragraph, we will go into the subject a little

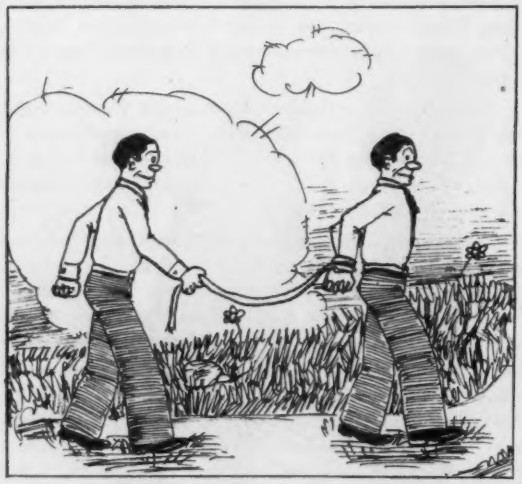
deeper and see what is in store for the man who can learn to be master of *himself*.

Of course if you have sent in your name you need not read the following.

I once read a book entitled "Every Man a King," and I claim that there is no line of work on God's green earth where a man can be as near "king" as he can as overseer or superintendent of a cotton mill.

An overseer or superintendent has more authority over the people who work for him than in most any other line of work. Even the President of the United States cannot discharge his subordinates without consulting others.

An overseer or superintendent practically shapes the destinies of many of his employees if he will try. And every overseer and superintendent *should* try. He can cause many of them to make more money than they have made before. He can teach them to save part of their wages—he can teach them that discipline not only helps the company but helps them—he can teach them to take pride in



ARE YOU MASTER OF YOURSELF?

their work rather than think of nothing but stopping time and pay day. "Old Timer" has given you several articles right along this line.

But I am getting away from my subject. My message to you, Mr. Overseer and Superintendent, is that if I can ever get you to realize that if you will only learn how to control *yourself*, to be master of *yourself*, you have then found the key to the door of success—that bigger job with a small fortune—by the time you are too old to work.

Now, I'll admit that is making a pretty big promise and I realize I can't cram it down your throat, so to speak, but if you will listen to me—if you will really take Old Timer's dope to heart like some of the readers of Cotton are doing (we have the proof), in five to ten years' time you will have found (see, I put it in the past tense) that pot of gold at the end of the rainbow which you turned your nose up at when I told you it was really there.

You know, you must have *faith* in anything to make it a reality. You would not have believed your good mother when she told you there was a God if you had not had faith in her.

Old Timer has been hammering at you for several years now, through Cotton. He has told you frankly that he is not a professional writer—his dope is based on actual experience—he is not giving you "hot air." If you don't be-

CORRECT CONTROL
BANDING DEVICE

The little instrument shown on the spindle will SAVE AT LEAST 15% OF YOUR SPINNING FRAME POWER CONSUMPTION, GREATLY IMPROVE YOUR QUALITY, AND PAY FOR ITSELF IN SIX MONTHS. WE CAN PROVE OUR STATEMENTS!

The largest cotton mill unit in the world is equipped: WHY LAG BEHIND?

Some of the LATEST MODEL PLANTS IN THE SOUTH ARE EQUIPPED: Have you read page 1206.

COOK-TAYLOR CO., INC.
124 Granite Block
FALL RIVER, MASS.

GARLAND

IF YOU ARE NOT QUITE SATISFIED NOW

Try a GARLAND Standard Grade LOOM HARNESS

No better looking, better weaving or better wearing loom harness can be made than those we are turning out. The best materials, great care in manufacturing and rigid inspection from the knitting to the finished harness are bound to produce harnesses of superior quality.

TRADE MARK

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lieve he practices what he preaches, ask his editors—if they don't give you any assurance that he is on the "square" then I will call the dogs off.

If you were just a common operative I would not be quite so sure of my ground. But I know you are a man above the average intelligence, otherwise you would not be an overseer or superintendent, therefore I *know* the material I am working on, that is the way I have reasoned it out.

Now will you listen? Will you drink it in and join hands with me? If you will, the things I have promised you will surely come true.

What I am trying to tell you is as old as the hills—it is nothing new—the wise men taught it in Biblical times—in fact, the one big quality I am trying to show you, that you and every other intelligent man has within his brain, is spoken of in the 23rd chapter of Proverbs, 7th verse.

"As a man thinketh in his heart, so is he."

In other words, you *can* be master of yourself if you are man enough to learn how to control yourself.

"Mind rules the body" is not a new saying, but it is as true as any four words which were ever spoken.

The strange fact about it is, that so few of us know it. The way a woman (and some men) drive an automobile reminds me very much of the way the average overseer and superintendent rules or governs *himself*.

They do not seem to realize what is possible for a human being to accomplish if he can be *master* of himself.

Some wise man has said that "A character is a man who does not allow his temper and moods to govern him."

When things go hard with you, when everything seems to go against you, when it just looks like you have got the darndest, meanest job on earth, that is the time to find out if you are master of yourself.

If you are made of the right kind of "mud," adversity will bring out the *good* qualities. No man ever amounted to very much who always had easy sailing on his job.

The world makes way for the man who has determination—determination backed up with sound judgment and an even temper; for the man *who has taught himself how to do the things he can tell the other fellow how to do*. Now don't get the wrong thought by saying to yourself—I will look pleasant—I will have one of those perpetual smiles I hear them talking about—I will make people think so and so.

No, old man, that won't work—you can't get by with a "bluff," because, "As a man thinketh in his heart, so is he."

You have seen a man hypnotized, I suppose. Well, if the hypnotist tells him he can't get up out of the chair he is sitting in, he can't. Why? Because he has lost control of his mind. If you don't *think* you can run the job, for God's sake, man, don't wait until Saturday to quit—do it now. Don't even go by the desk to get your old hat.

That infernal word "Doubt" is a first cousin to the word "Failure," and once you let him get hold of you he will bring along all the rest of his no-account cousins like Mr. "Take-it-easy," Mr. "I can't," Mr. "Don't-give-a-dam" with the final Mr. "Resigned-for-his-health." And, with the result that the next time you hear of that fellow he is running a section for the man who has learned something about how to be master of himself.

An overseer or superintendent is *made* or *unmade* by *himself*. You may have worked for or with some good men in your day, but unless you do your part—unless you learn to *do* the things which you *know* how to do—unless you can make yourself stick to it—keep everlastingly at that production or that cost or whatever it is that your job needs the most—then you need to learn how to be boss of yourself instead of trying to boss somebody else.

You know you can plant the finest seeds the market affords in your garden, but you won't get much out of it unless you cultivate that garden.

An overseer or superintendent may have all kinds of fine ideas—he may know *how* to get production—he may know *how* to make first quality come out of a department or a mill, but all that fine knowledge isn't worth a darn unless he will *do* the things he *knows* how to do. That, my dear reader, is the one big thing that is holding most men down today. *They can't boss themselves.*

So many men think a job will run just because they *want* it to.

Tall trees do grow from little acorns—but, by George, *you* have got to plant the little acorn instead of waiting around the best days of your life for "Luck" to plant it.

Oh yes! It is no trouble at all to find just "oodles" of pretty good fellows that *want* a better job, but when they find out that they must make personal sacrifices—that they must work while the other fellow loafs—and that they must burn the midnight "white juice" (it used to be a candle) if necessary in studying text books and magazines in order to improve themselves—in order to educate themselves—

Say! How many times have *you* told yourself that you were going to do some of those things?

"Are *you* master of yourself?"

Haven't you had a "cracker-jack" section man who would let another section man who did not *know* half as much about the machinery, beat the dickens out of him getting production and with less supplies? Sure you have. Can't you see that a man's rank in the world does *not* depend on what he knows as much as it does on what he *does*?

Every overseer or superintendent should have (and thank the good Lord, many of them do have) a higher ambition than to merely make a living, to go through the day's work as easily as possible. You should be master of yourself enough to make yourself stand up for what you really know is right, to *demand* of yourself to do your level best, to develop the highest ideals that are within you—to do the square thing by yourself—to make yourself be a man—the man you know you can be if you can learn to control yourself.

Walter Camp (the originator of the "Daily Dozen") was probably the most widely known teacher of physical training of any man we have ever known. He could train foot ball squads to the very highest efficiency—he could teach business men how to prolong their lives. He taught whole armies how to be physically fit—

A few months ago he was found dead in his bed—he did not teach himself what he so ably taught thousands of others.

Was he master of himself—could he control himself?

Holy smoke! It is most midnight, and the whistle will blow at the same time tomorrow morning, so good night—me for the "hay"—but before I go, I want to ask you in all earnestness, won't you take "Old Timer's" advice and make an honest-to-goodness effort to learn to be overseer or superintendent of *yourself*?

Fresh Ideas

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Fresh ideas always indicate reserve strength in competitive business. The trouble with many one time leaders is that their ideas lose freshness. Business methods that brought them to the front become their speed limit. They lack the spurt of *fresh* ideas.

Conditions change; methods that were successful become antiquated or ineffective. Some house in the rank and file grasps the new opportunities which the leader fails to see and a new leader comes to the front.

Excellence of product and service are fundamental but they are not enough. To *maintain* leadership fresh and practical ideas are needed and their one source is *exact knowledge*—exact knowledge developed thru the new, the fresh, the practical in modern business accounting, up-to-date budget and costs systems, and the establishment of good will.

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HOW OTHER MEN MANAGE

Practical Discussions by Cotton's Readers On all varieties of Mill Subjects

We invite our readers to make use of this department for the discussion of any and all problems arising in the mill or the finishing plant. Questions, answers or letters need not conform to any particular style and will be properly edited before publishing. The editors do not hold themselves responsible for any statements of opinion or fact which may appear in this dapartment unless so endorsed. This department is open to all.

Bunches in Twisted Yarn.

Editor Cotton:

I am having trouble with my yarn after it is twisted. I find it full of bunches, but these bunches do not appear in the single yarn. The accompanying bobbin of 40s/3 yarn shows this effect. This yarn, when spun on the mule, is clear, but after being doubled on the spooler and twisted on the twister, it shows the bunches.

We use the Attwood spooler with the tension rod covered with flannel. I think that this trouble is caused by the fly waste coming from the flannel. These bunches show on only a few bobbins, and as I am in the spinning department, and have no way of finding out about this trouble, I am asking the assistance of the readers of "How Other Mer Manage."

Contributor No. 4209.

A New Type of Filling Wind.

Editor Cotton:

I have been running filling wind on my warp frames for 32s warp for about a year and a half, and have always thought it better in some respects than the old warp wind. First, I formerly ran my doff about 5 hours, and when I changed to the filling wind, I got about 5½ hours on my doff.

Now, adding thirty minutes to a doff means a reduction in cost due to doffing for those who pay by the doff or side. It also means a reduction in the cost of spooling as each box of yarn contains more actual yarn and not so much taper as on the old warp wind method of spinning. This addition of time on the bobbin means money to the mill and help to the weaving, as there are fewer knots that go to the weaving, and consequently less stoppage.

I have run my filling wind steadily on my old warp bobbins as I did not care to go to the expense of buying new filling wind bobbins with cones at the bottom, as my old warp bobbins were still in very good shape. There has always been trouble with our filling wind on the start up with these bobbins, due probably to the fact that our bobbins had no cone at the bottom. It was hard work for the spinners to keep up their sides immediately after a doff, as the ends were gifted with the desire to part company with the front steel roll. (They are given to this idiosyncrasy sometimes.) However, after running for a little while, and when the bottom of the bobbin became filled a bit, the frame ran right along until the next doff, with the usual amount of ends down.

I was never definitely converted to the idea that filling wind was of much greater advantage over warp wind, probably due somewhat to my own stinginess in not buying new bobbins of the proper shape. (However, I am told by higher authorities that stinginess is a virtue during these trying times in the textile business.) However, the idea of a cheaper cost due to a longer doff, and a possibility of an infinitesmal help to the weaving, we continued on filling wind. Maybe we were disposed to follow the trend of the times, or, in short—to be in style with the other mills.

We have continued along for these months, still using the usual filling wind, until a friend of mine dropped in one day and we went through the mill. I always ask him if he has heard of anything new, and he usually has something up his sleeve besides his arm, and his visits are always abundant with food for thought. He told me of being in Such-and-such Mill, and they were using a new kind of filling wind. All that he knew about it was that they were using a warp cam but a filling builder on their warp frames.

Well, I am one of those who like to try a thing, so I got together with my boss spinner, and we talked it over, and I told him to try a frame or two. We experimented with two frames and got them to working so well that we have changed over all our frames from ordinary filling wind to a wind employing a filling builder but a warp or heart-shaped cam.

There are marked advantages in this system. We could still use the old warp bobbins and get all the advantages of the warp wind and all the advantages of the filling wind. In changing over to this filling builder and warp cam it is necessary to shorten the stroke of the builder. For instance, on our bobbins when we were running the regular warp wind our stroke at the beginning was 6½ inches and decreased on down as the desired taper was formed. Now, with the filling builder and the warp cam, we set the chain back on the arm so that the stroke at the start is 4½ inches. This is maintained throughout the building of the bobbin.

The finished result is that we have a filling wind that has very few changes on it, which naturally decreases the chances for strain of the yarn due to these changes. There are no more changes than with the old warp wind.

I would state here that our doff was again lengthened from 5½ hours to 6 hours, which was a further saving. Furthermore, since the stroke was 4½ inches on the start and all the way through, we consequently had our spinning running as good right after the doff as at any time. We had an increased length of doff, and we had better running work than ever before.

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You will note we have stepped from a 5-hour doff to a 6-hour doff in two steps, and we believe the latter step the best.

The reason for the increased length of doff is that the taper is shortened at both the top and the bottom. In fact, at the top there is practically no taper at all—just a round, abrupt finish to the wind.

Some hints in regard to the change might be worth while. First, all the cam followers must be attended to and any that are worn or stuck must be repaired, else the yarn will be apt to tangle at the change. Second, all lifting rods must be working smoothly or else the rail is liable to become stuck.

In regard to spooling, we have found that a spindle speed of 1,000 on the spooler is best so that the yarn balloons properly during unwinding from the bobbins. Lower spindle speeds did not work so very well.

The idea involved in this letter is not original with us at all, and other mills are running it—a few that I know of—but if others have not heard of it, the idea is hereby passed along with the view that some others may be benefited as I have been. R. T. W. (N. C.)

The Value of Scavenger Roll Waste.

[Editor's Note. An inquiry recently reached the editorial desk from a correspondent as to the relative value of scavenger roll waste or under clearer roll waste from the spinning frames and the cotton from which it was originally manufactured. Some mills put this waste back and rework it, while other mills do not. Therefore, in an effort to secure a composite opinion from a number of successful mill managers for our correspondent the question was asked of these men as to how many points off the market price of the cotton from which such scavenger roll waste was made should be allowed in considering the value of this scavenger roll waste for manufacturing purposes. Following are the replies:]

Editor Cotton:

It is our custom to rework and use all scavenger waste that is made in our plant. I would say that this should be worth around 85 to 90 per cent of the value of the cotton from which it was made. Card strips are the best grade of waste that we sell and the price we get for them is usually around 75 per cent of the price of the original cotton. Scavenger waste is clean, has good staple and is well worth, I think, the price indicated.

Contributor No. 2728.

Editor Cotton:

I have always practiced putting the scavenger roll waste back into the regular work and I consider it worth from 80 to 85 per cent of the value of middling cotton for ordinary spinning purposes. It might be well to add that my opinion is based on the results of experiments that I have conducted with various grades of cotton mill waste. Contributor No. 2729.

Editor Cotton:

We rework all of our scavenger waste and mix it into our regular stock. We run it in small quantities, that is, just enough to keep up with the waste, with no definite percentage to the mix. We do not have enough of such waste to injure our work or affect the breaking strength of our yarn. Our reworked waste is put into the regular stock through a small waste hopper attached to a latticed apron, being distributed in this manner into six regular hoppers. Therefore, you can readily see the waste is fairly well distributed and evenly mixed with the regular stock.

I believe the value of scavenger waste is about 90 per cent of the price of the cotton, therefore, we figure that it is more economical to rework this waste than to sell it to the waste mill. Of course, if we had an excessive amount it would not be good practice to rework it. Especially would this be true of fine numbers.

Contributor No. 2730.

Editor Cotton:

Regarding the use of scavenger roll waste, I would state that it depends a good deal on the character of the work for which this waste might be used, but as a general average, in a mill using good cotton, this scavenger waste in the white should be worth anywhere from 80 to 85 per cent of the cotton from which it was made and under exceptional circumstances it might be worth well on to 90 per cent. Contributor No. 2731

Editor Cotton:

I have always used clearer roll waste, running this back into our regular stock, therefore it will be impossible for me to give you any definite idea of the value of this stock. I have always mixed this clearer roll waste with card strippings on a waste machine. The principal trouble with clearer roll waste is that it gets slick; in other words, the natural curl in the stock is drawn out. By mixing this waste with card strips it forces the mixing man to get a little better distribution of such waste in the good stock.

Another trouble with waste from the under clearer roll is its tendency to make a lot of split laps in the card room unless it is very evenly distributed in those laps.

When this clearer roll waste is distributed on a distributing system like I have built in our shop it gives very little trouble. Contributor No. 2732.

Editor Cotton:

The value of scavenger roll waste, in my opinion, depends upon the proper reworking. If a mill has the proper equipment for reworking this class of stock, that is, having the stock thoroughly opened and fed gradually into the breakers so as to thoroughly distribute it and prevent split laps, it is easily worth the price of middling cotton. It is true that this class of waste upon reworking, loses some short fibers due to breaking, but this is more than offset by the bagging, ties, motes, etc., that are lost from the original new cotton from which such waste develops.

Contributor No. 2733.

Editor Cotton:

With reference to your contributor's question as to the value of scavenger roll or under clearer roll waste, I would say that I cannot state just what this valuation should be. We take our scavenger roll waste and mix it in with our regular stock, that being the only disposition we make of it. While I have heard of mills which sell and buy scavenger roll waste, I have never been connected with a mill which did this. There has been so much brought out in recent textile discussion meetings as to ways for utilizing

this waste, that I believe the larger percentage of mills now are reworking it. The most important thing is in the reworking, and in our case we do this similar to the method described some months ago in COTTON—that is, we spray a fine solution of caustic on the waste, as it goes through the reworking machine, which restores some of the natural curl that has been removed in the drawing processes. Then we let this lie for several days before mixing it with the regular cotton so that the caustic may become distributed throughout the lot.

Speaking specifically with reference to the value of this waste, while we have never figured this, I can say that when we take our usual inventories, we figure the scavenger roll waste in process at the same value as lap cotton. This may be a little high, theoretically, but it answers for our purpose. I know that card strips sell at about 25 per cent below the cotton from which they are made, and to make an estimate, I should say that scavenger roll waste would be about ten per cent off, or worth about 90 per cent of the value of the cotton. CONTRIBUTOR No. 2734.

Grinding the Licker-in.

EDITOR COTTON:

I have read the letter from "Experience" appearing in the August number of COTTON with a great deal of interest, as I for one, did some licker-in grinding about fifteen years ago, for which I was severely criticized; however, I got the desired results at that time and at different times since.

The main difficulty I found was that the lickers-in could not be ground very much, as the more they are ground the broader the points become in working surface. It is not like grinding card clothing wires. Card clothing wires are the same diameter all the way down to the bottom, while licker-in teeth get broader as they are being ground down on, but they can be ground down several times without any injury to the stock of cotton going through the cards.

I had some stands cast for the grinder rolls to run in and kept them handy at all times. When I found a dull licker-in I would run my grinder roll on it awhile until I got it in good shape, and I believe it is a good thing to have in case of emergency and when the licker-in is not worn enough to re-clothe. Even then it is not necessary to wait four or five weeks to get it re-clothed. Shops are too handy these days and transportation is too speedy for that.

T. A. D. (GA.)

EDITOR COTTON:

It seems that I not only stepped on "Experience's" toes, but he had a corn on one of them. However, I am coming back at him and he had better put his shoes on.

I certainly did say in the May issue to lay off the practice of licker-in grinding and I'll stick to it in whatever issue this letter appears.

The practice of grinding the licker-in is not practical and is detrimental to good work. Here is my reason: The teeth of the licker-in are saw toothed and staggered over the surface of the cylinder. If the rows of teeth were even over the entire length of the licker-in (not the circumference) then they could be ground to good advantage. If, as I say, these rows of teeth were even, a disk emery wheel made to coincide with the shape of the teeth could be run through these rows and in this manner grind the back of the teeth, keeping the original point on the nose and also keeping the original shape of the tooth.

Sad to relate, however, these Utopian conditions do not exist. The present method of grinding the licker-in teeth is to grind the top of the tooth. Therefore, as I said in the May issue, and still say, *the top of the tooth is ground off and the original shape is altered.*

Here is how "Experience" can prove it to his own satisfaction without a research laboratory: He should buy himself a new wood saw and sharpen the teeth with a file, filing on the top of the teeth. Then take it in the wood shed and saw up a cord of hard wood (stove length) for the "missis." The old saw would cut slick, wouldn't it?

"Experience" says in his second paragraph, August issue: "Furthermore, the shape of the teeth does not change the least bit, as the grinder is made for that purpose." Then further on, in the seventh paragraph he states: "and even though I sometimes re-grind my lickers-in and run them 350 r.p.m., I am not troubled with sending many to the shop, only when they become short and I cannot get the proper setting."

If the shape of the teeth does not change the "least bit, then why should the teeth get so short that "Experience" cannot get the proper settings?

If one must throw boomerangs one must not forget to duck.

I fail to see the point which "Experience" makes in bringing up the question of grinding the cylinder and doffer to back up his practice of licker-in grinding. Try as I will I cannot see any similiarity between cylinder and doffer clothing and the clothing used on the licker-in. There may be a strong resemblance when viewed under a powerful microscope, but to the naked eye this resemblance is not apparent.

The mill with which I am connected at present has close on to 500 cards, running sixteen hours a day (two shifts) and manages to struggle along without a licker-in grinder, and there are not so many cards stopped for new lickers-in for four or five weeks that they can't keep up with the drawing. It may seem strange, but it is a fact.

If one is careful to remove all hoops from the bales before feeding in, I don't see any reason why the full value should not be received from the licker-in clothing before it gets so short that the proper settings cannot be obtained. And that holds good even when the licker-in is run at the terrific speed of 425 r.p.m.

"Experience" admits that a good licker-in will last a long time. There are ways of carrying economy to the point where quality is impaired, and, in my opinion, grinding the licker-in is one of those ways.

However, while the iron is hot, why not have a few remarks from some of the other readers as to whether they take my point of view or that of "Experience." I should like to know what "Wash" thinks about it.

I know "Experience" is a good sport and will not take this letter as a personal "slam." It is difference of opinion that makes horse races. C. C. (N. J.)

EDITOR COTTON:

I have read with a great deal of interest the offer of sympathy to "C. C. (N. J.)" by "Experience (Conn.)." I certainly hope that he doesn't convert "C. C.," for if he

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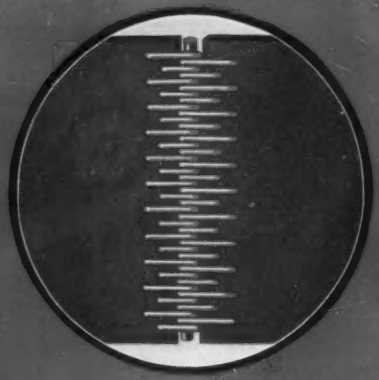

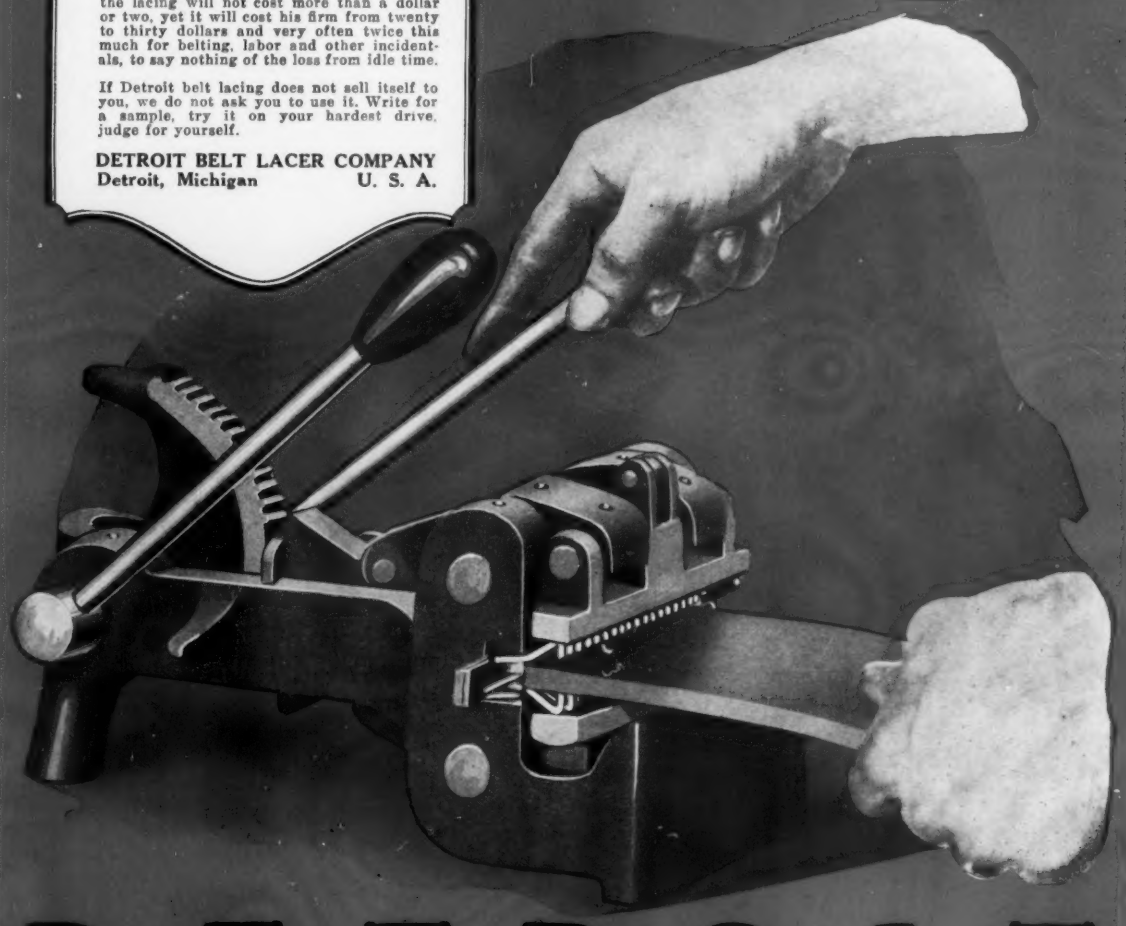

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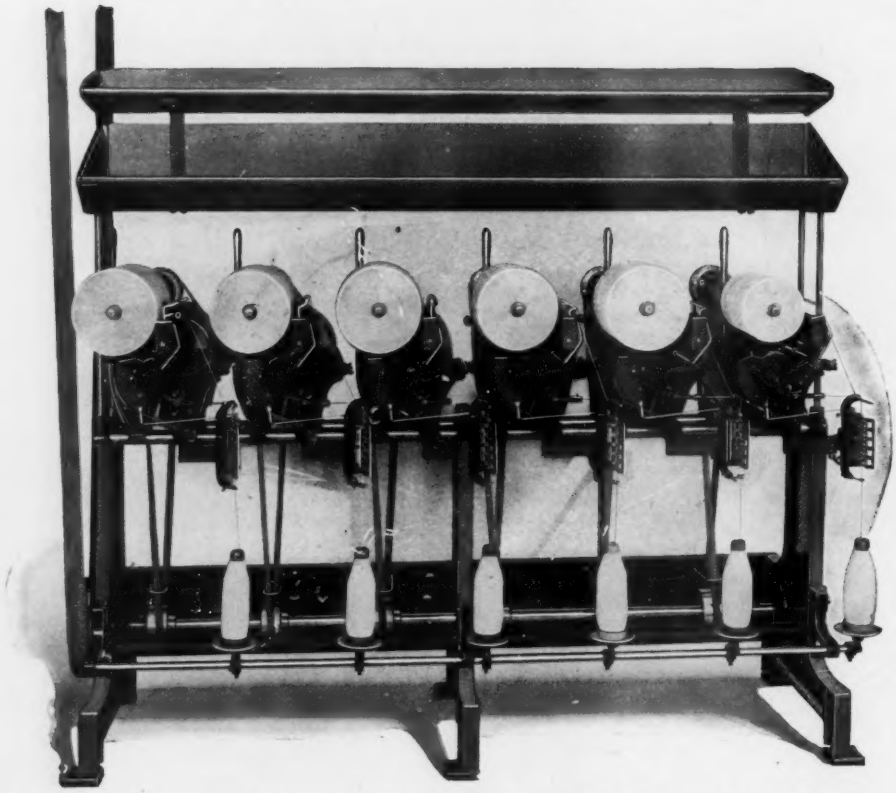

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John Hill, Southern Representative, Healey Bldg., Atlanta, Ga.

does "C. C." will certainly fall from grace in the eyes of all the card men. I believe better things of "C. C." however. I think that he is too strong in the faith to grind his lickers-in. I said "grind," but I don't mean just that, for they can't be ground. I would be afraid to make such a broad statement as that if I did not know that there are many men who really know carding, and I do not mean to intimate that "Experience" does not.

Trying to grind a licker-in this day and time can be compared with the difference in making a trip in an ox cart from Boston to California, as did some of our forefathers, and the same trip in a Pullman car today. Card wire can be ground with several different points on it, but lickers-in can only be ground with one kind of a thing, that can't be called a point, for the wire is so stiff that it can't bend down in front of the grinding roll at all. Now licker-in wire is made with a certain pitch and is put on the licker-in tightly and it then takes about ten degrees more pitch by being put on a small drum and it is impossible to grind that wire right any more. I know that an old worn-out licker-in can be smoothed up and will feed the cotton to the cylinder in a smoother way and make the web look from 25 to 50 per cent better, but that is not setting the licker-in to do what it is put in the card to do.

You can put two small feed rolls up close to the cylinder and get just about as good results with them as you can with a ground licker-in. I am telling what I know and not what I think. The old way of stopping a card, or any other machine, is getting to be a thing of the past, for the repair shops can and are glad to lend a mill lickers-in and flats while their repairing is being done, so let's all pull for the best and not for the makeshifts, for the best is what pays. S. M. (GA.)

Desires Greater Breaking Strengtn.

EDITOR COTTON:

We are making a 42s yarn out of 1 5/16-inch Peruvian cotton, which has a breaking strength running from 31 pounds up to 40 pounds sometimes. I would like some suggestions from readers of "How Other Men Manage" as to how I can improve this strength. For their information I give below our hang-up on this work, so they can make any recommendations of changes that they think will help me.

I make a 12-ounce finisher lap, a 45-grain card sliver, a 585-grain comber lap, a 50-grain finisher drawing sliver, 1.00 hank slubber roving, 3.00 hank first intermediate roving, and a 10.00 hank from the roving frame, for making the 42s yarn. My twist is 3.8 times the square root of the yarn number.

My picker beater speeds are as follows: First beater, three-blade, 850 r.p.m.; second beater, two-blade, 1,300 r.p.m.; and third beater, two-blade, 1,100 r.p.m.

On the cards I have the following settings: Licker-in to cylinder, 7/1000; flats to cylinder, 10/1000; doffer to cylinder, 7/1000. The percentage of waste on the combers is 12.

Roll settings on the sliver lap and ribbon lap machines are the same, being as follows: 1 11/16, 1 13/16, and 1 15/16. On the comber draw box they are: 1 9/16, 1 11/16, 1 13/16, with these same settings on the drawing. The slubber roll settings are: 1 9/16 and 1 13/16; intermediate 1½ and 1¾; roving frame, 1⅜ and 1⅝; spinning frame, Washburn middle roll, 1⅛.

If some of your readers can recommend any changes or improvements that will aid me in my breaking strength, I will appreciate it. R. L. (MASS.)

Combers and Combing.

EDITOR COTTON:

I have studied the article by "Jock (Mass.)" in the August number of COTTON pertaining to combing and find that he has written a very complete criticism on my ideas concerning this subject. I appreciate his interest and am sorry that I am not able to agree with him, but some discussion, I believe will bring out some profitable information. "Jock" has asked for proof as to wherein he is wrong, so I will take his article by paragraphs and try to show my theory compared with his.

First, let me state that his article which appeared in the September number was not hard to understand and his exposition was very complete. The part that I did not agree with was where he makes the statement that the half lap combs only 50 per cent of the cotton. My idea was to break down, to a certain extent, the dread that some men have of a comber and its action, for while being a very complicated machine, mechanically, still the principle of combing is simple, and when studied carefully can be easily mastered. I can see that "Jock" has given considerable thought to combing and has mastered the details, but he must remember that there are many readers of COTTON who have not, and still are very interested in seeing something regarding combing.

I will try to show that the half lap does the bulk of the combing My combers feed in 19.11 inches per minute. This figure was obtained by actual measurement, not figured from the gears. I stated, the feed roll turned 1/5 turn at a time instead of 1/5 of an inch (I believe this was a misprint) and delivered 1/3 of an inch of cotton at each 1/5 turn. This is incorrect, as the feed roll does not turn 1/5 turn per nip, as these figures will show, but turns 9.164 per minute. The 1/3 of an inch delivered was an estimate but these figures will show it to be about 1/6 of an inch. The cylinder shaft carries a feed pin which turns the star gear. The star gear carries a draft gear of 16 teeth, driving a 44-tooth gear on the feed roll. Therefore, when the cylinder makes 126 r.p.m.

$$\frac{126 \times 1 \times 16}{5 \times 44} = 9.164 \text{ r.p.m. of the } \tfrac{5}{8}\text{-inch feed roll.}$$

$$\frac{9.164 \times 5 \times 22}{8 \times 7} = 18 \text{ inches, but allowing for the}$$

flutes in the roll will make up the other 1.11 inches. There is a slight draft between the feed roll and the lap rolls which might be considered for extreme accuracy. This brings us right back to the fact that while 19.11 inches go into the comber, the cylinder makes 126 turns, thus passing through every .15 inches, or 6 times to the inch.

"Jock" states in the 6th paragraph, "Then, in working 1¼-inch cotton, the half lap has combed only ⅛ of an inch and there is nearly 1 inch of cotton or fibers to be combed by the top comb." For the sake of simplicity, the following diagrams are given showing the passage of one individual fiber, 1¼ inch long, through the comber.

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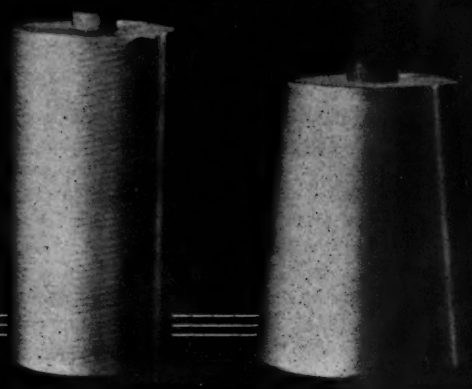


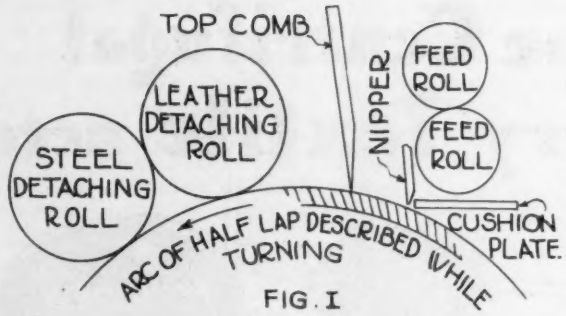
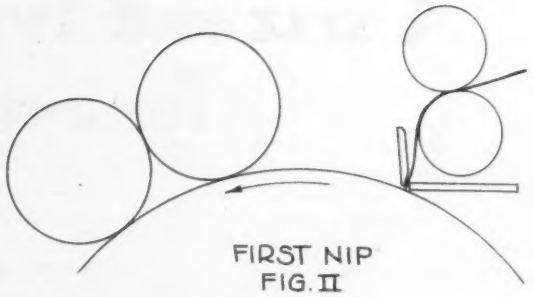
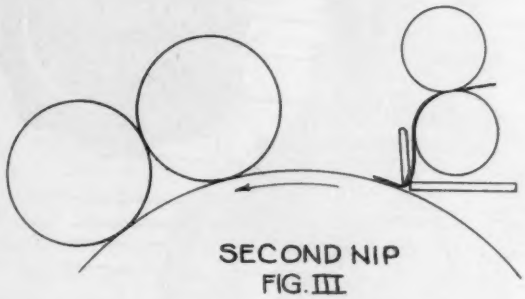


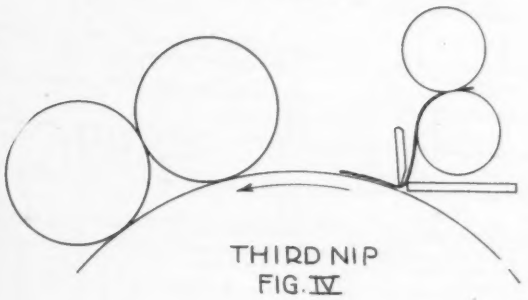
FIG. I



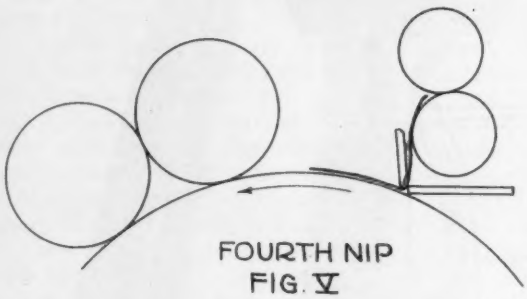
FIRST NIP
FIG. II



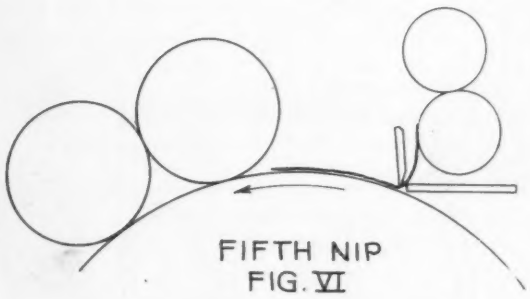
SECOND NIP
FIG. III



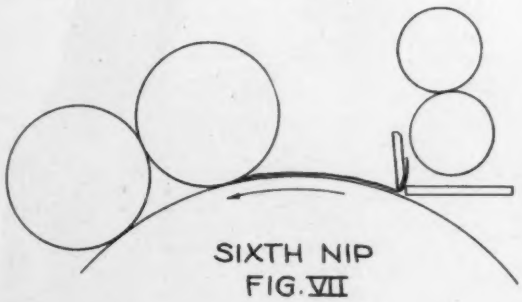
THIRD NIP
FIG. IV



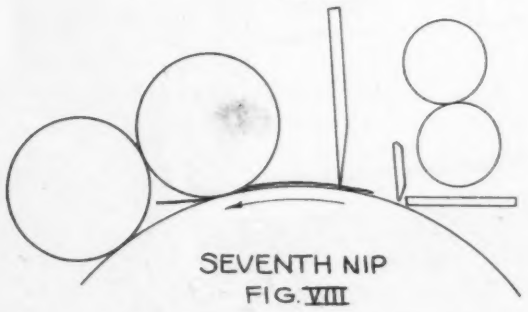
FOURTH NIP
FIG. V



FIFTH NIP
FIG. VI



SIXTH NIP
FIG. VII



SEVENTH NIP
FIG. VIII

Fig. 1 shows the setting, drawn as near as possible to actual size. The half lap circle is 3½ inches, the detaching rolls .89 inches in diameter and the feed rolls each ⅝ of an inch in diameter. The cushion plate and knife are not drawn to scale. The cushion plate is shown set 1⅝ inches from the steel detaching roll, and the feed rolls 1 11/16 inches. The top comb is set in about its normal position in the drawing, but is not exact.

Fig. II shows the first nip, with the 1¼-inch fiber just hanging through the nippers.

Fig. III shows the second nip, with the fiber advanced about 1/6 of an inch.

Fig. IV shows the third nip, with the fiber advanced about 2/6 of an inch.

Fig. V shows the fourth nip, with the fiber advanced about 3/6 of an inch.

Fig. VI shows the fifth nip, with the fiber advanced about 4/6 of an inch.

Fig. VII shows the sixth nip, with the fiber advanced about 5/6 of an inch.

Fig. VIII shows the seventh nip, with the fiber advanced beyond the bite of the nippers and under the bite of the detaching roll. In this figure the top comb is shown combing the tail end of the fiber as it is pulled forward by the detaching roll.

The detaching motion is, of course, operating on each of the nips shown in the figures, but from these diagrams it will be readily seen that the individual fiber cannot be reached by the detaching rolls until it has advanced about one inch from the nippers, and during this time has been

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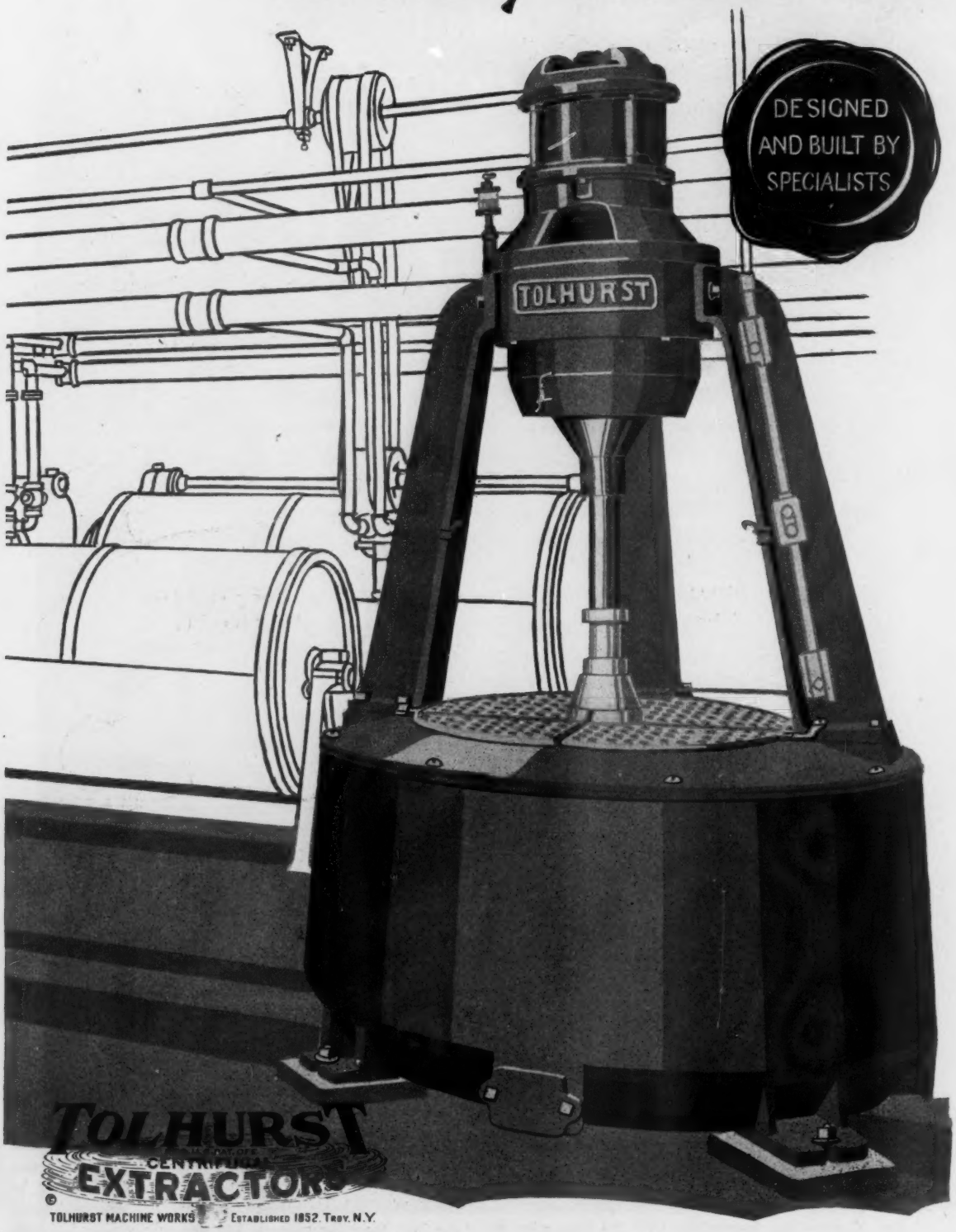

combed six times by the half lap. When the tip end is gripped by the leather detaching roll and segment, the tail end has left the bite of the feed rolls and can be pulled through the nippers. As this tail end could not be acted on by the half lap, the top comb must comb it out. As the detaching rolls pull the fiber forward they have a tendency to raise it up from the cylinder and into the teeth of the top comb. Previously, the half lap has pulled the fibers downward at each nip, so that the top comb has done very little combing. The top comb is not shown in the diagrams except in Fig. VIII, for this is about the time it begins its work.

We have only considered one fiber in this explanation, for the sake of simplicity, but consider now a great number of fibers. They are not all advancing evenly; some are almost ready to be gripped by the detaching rolls, while some are just starting into the path of the half lap, and others are in between. They must be combed six times by the half lap before they can be pulled out of the bulk of the lap behind them. I think this explains "Jock's" next paragraph, wherein he says, that the half lap cannot pass through the cotton five or six times, for the detaching motion would have to remain stationary for five or six nips.

The fibers, to be combed by the half lap, must be held at the back, this being done by the nippers, and to be combed by the top comb, must be held at the front, this being done by the detaching roll and cylinder segment.

I doubt if "Jock" really thinks that the length detached has anything to do with the number of times the half lap passes through the fibers. The detaching motion backs up to allow the fibers just combed to lay over the ones previously combed, and then reverses and goes forward out of the way, while another nip is taken. All the detaching motion is for is to piece up the end which was broken while combing, and as its longest motion is forward, how can it comb any fibers through the half lap, while turning in the same direction as the needles slant?

In the next paragraph, it would almost appear that the fibers were held at both ends at once and combed in the middle, which is absolutely not the case. The fibers are held by the nippers, just as we would hold them in stapling, and combed by the half lap, advancing a little each nip, until the front end can be gripped by the detaching motion, at which time the other end has advanced beyond the bite of the nipper, so that the fibers are loose at one end at all times, until pieced up to the web by the detaching motion. If "Jock" will time his laps, see how long they run on the comber and measure the inches per minute fed, I believe he will find his half laps are doing most of the combing.

I know what "Jock's" theory is about the length detached. He believes the detaching roll pulls the fiber forward after one nip is taken, but by studying the diagrams he will see that the fiber cannot be gripped by the detaching rolls, as it has not advanced far enough before six nips are taken. On a Whitin comber, the detaching rolls are in fixed bearings and must wait until the fiber reaches them before they can grip it. On a Nasmith comber the detaching motion rocks, but it does not move up to the nippers to grip the fiber; it moves away to be out of the way of the cylinder. In other words, when running 1¼-inch cotton, the bite of the detaching roll and segment is always a trifle more than an inch from the bite of the nippers, depending on the closeness of the setting. Of course there is a long draft between the feed rolls and the detaching motion, and this accounts for the number of inches being increased at the detaching roll, but it has no effect on the number of times that the half lap passes through the cotton. Another point to remember is, that the half lap does not carry the cotton forward.

Regarding the leaf and dirt taken out by the comber, he has misinterpreted my meaning, as I did not mean that it fell out, for we all know the trash goes along with the short fiber into the noils, but rather that the primary object of combing is to remove short fiber, in the same manner that a drawing frame's primary object is to parallelize the fibers. However, in doing its work, the drawing frame shakes out a lot of leaf which, of course, is an added asset. The comber does the same thing, but its object is the removal of the short fiber, and in the paragraph where "Jock" says, "From my practical experience on combers, I have found, in a way of speaking, that the comber is a good grader of cotton," he shows that he knows what a comber is for.

In regard to the sliver lapper, I am convinced the slippage of the top rolls is what caused the difference in weight, and that with the wide setting, better drawing is obtained.

I hope we can have some more articles on combing, and if anyone can convince me that the half lap only combs 50 per cent of the finished work, I hope he will do it. The only point that was incorrect in my previous article was where I stated the feed roll turned 1/5 turn, as though the star gear was on the feed roll, instead of driving through the draft gear. I am ready to stand back of the rest, and say that the half lap does 90 per cent approximately of the combing, and the top combs only assist by combing the tail end of the fiber, which could not be combed otherwise.

M. W. H. (Mass.)

Cotton and Good Work.

Editor Cotton:

A few years ago, when I first started in the mill game, it was always necessary to get the proper cotton, both in quality and length of staple, for the numbers one wanted to spin. The superintendent would consult with his carder and spinner, as to the samples of cotton, and all three would use their judgment in regard to its condition of length of staple and quality. If all agreed, the cotton was accepted; if not, it was rejected.

But it seems to me that methods of cotton selection have changed very much, as all other things have. I think the mill business has changed in the last two or three years more than any other business on the map. Now, take for example a mill spinning about 30s to 40s yarn, receiving an order that will require 70s and 80s filling yarn. What will happen? The superintendent will at once give his carder an order to change his room over for the roving required, and also his spinner, and all of the necessary changes will be made according to his order. But will he go ahead and do his part to cooperate by changing the cotton? Not so that you could notice it, because he thinks the cotton is equal to the numbers, and therefore starts things going right there. The cotton will be put in the picker room, and on it will go and trouble will start. And experimenting will also start, soon after, and when it gets

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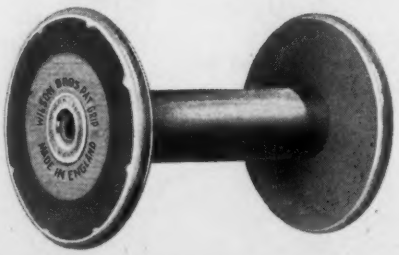
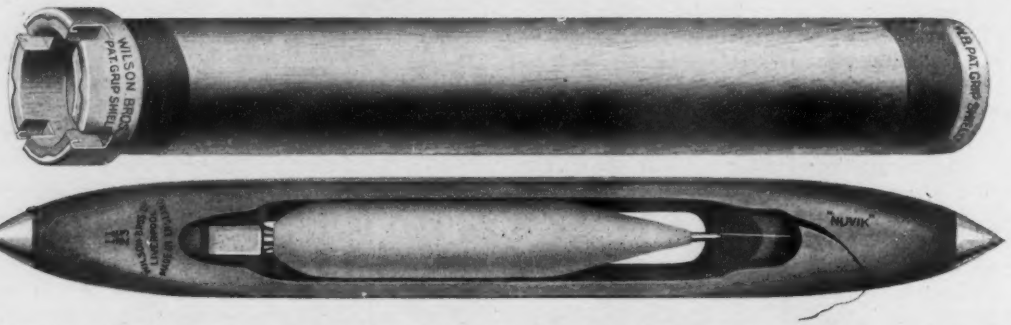


TRADE MARK WB



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to the speeders the carder will start things by putting in about four teeth more twist than standard. In fact, he will have to in order to run it.

And when it gets to the spinner his troubles will come. The first thing, his frames and warpers will begin to run very bad, and he will have to put in twist. Of course we all like to do that because it helps to lose production. But nevertheless, it must be done, according to the superintendent's and agent's orders.

Can any mill man tell me anything that will make more trouble around a mill than a mill full of rotten cotton, combined with high speed?

Putting oil on cotton to make it break stronger, as some of the men in the South are trying, may be all right down there, but I don't think many of us in the North would like to try it. I, for one, can't see where it will amount to anything. In the first place, I don't think we could get it through the cards, and in the second place, I don't want to try it on any cards that I have anything to do with, for they would be in an awful mess to my way of thinking. One man says it did make an awful mess at first. I don't doubt it the least bit. It's a wonder he could ever run his cards afterward without reclothing them. If any man can spray any kind of oil in the cotton, and get by with it, and have the yarn break stronger, he doesn't need to work in a cotton mill.

It seems to me that it would be quite a difficult task to get the cotton through the cards, provided enough oil were put in to do any good whatever. And if it does go through the cards, it's a sure sign that when it gets to the spinning room it won't break anybody's arm to turn the yarn breaking machine. Take, for instance, the licker-in. Most all carders know that the least bit of oil or anything else on it will make a gummed-up mess, and it must be stopped and cleaned before it will run, and when it gets on the cylinder a very nice streak will be noticed, and the result will be it will have to be stripped and whiting put in the clothing to make it run.

Why go to the expense of buying oil to doctor up the cotton. That kind of oil must be rather expensive, to do such wonderful things. Why not take that money and put it into better cotton, and let the oil alone? Good cotton doesn't need anything to sweeten and strengthen it. We can do our part if the cotton will do its part.

What kind of drafting would be done with oil in the cotton? Isn't it hard enough to draft now, without making matters worse? I am beginning to think that someone will be trying to stick the cotton together with a little glue, some time.

Weak yarn comes from weak cotton, and no one can get around that. In order to get good, strong and clean yarn, we must have good, strong and clean cotton, and there is no other way out of it. Anyone can experiment until the end of the world and it won't amount to a peanut shell. We are getting along here in the North in some of our mills without the aid of oil in the cotton, and I don't see why the mills in the South have to oil their cotton. They have the first choice and ought to be able to get the best of cotton without much trouble. In my opinion, if any man is putting enough oil in his cotton to do any good, he will never get it any further than the picker room, and if it does get through to the spinning, the oil he put in must have blown out through the fan pipes on the pickers. Of course if one sprays the oil so fine that you can't see it, why it might possibly get through, but it won't be noticed in the breaking strength very much.

It is impossible to get something for nothing, and when it comes to oiling cotton, to get something for nothing, it will never be much of a success. Oil is all right in its place, but its place is not in the cotton. Good cotton doesn't need it, and poor cotton will not stand for it. Some of the men who have tried the oiling proposition know more than I do about it. I, for one, can't see anything to it but useless expense. My theory is to get a good grade of cotton with the proper length of staple, and stick to it, and have the same openings each time and the result will be a good running mill. I claim that anyone should have an opening of at least one week ahead. That will allow the cotton to dry out. I have seen all ways tried, and this is the best that I can recommend.

Anyone can see that when cotton is put in the picker as soon as it is opened it will have to dry out as it goes through the machinery in the carding department, and by the time it reaches the spinning room it will be all dried out, and the result will be weak yarn, and it will not break strong.

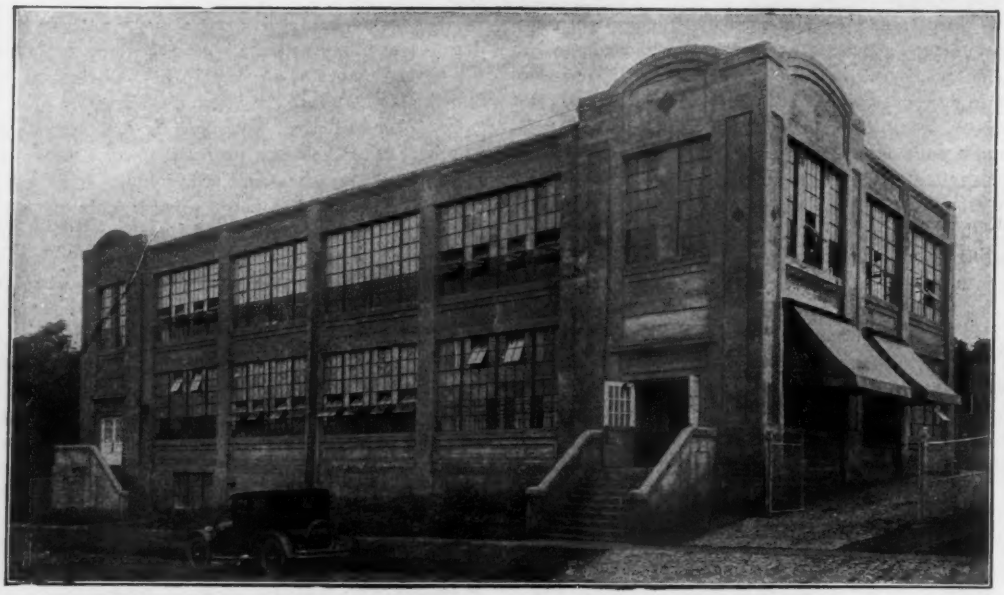
Of course, we all know that when cotton is first unbaled it is very damp and heavy, and the roving made from it in that condition is a different hank roving altogether when it reaches the spinning room because it loses weight in drying out. Whereas, if it were allowed to dry before leaving the picker room, it would be dry all through the mill.

High speed and poor cotton will put a mill on the bum quicker than anything going, and the mills here in the North are fast going in that direction. Unless they get onto themselves and make a change in the proper place—the cotton house—they will be in more trouble. Why, the mills are making such a poor class of goods that they can't give it away, let alone sell it, and still they will keep right on buying cheap cotton and trying to make first-class goods out of it. Some mills have shut down for that very reason, and others are bound to follow. You can't buy a few bales of good cotton and try to mix it with some poor stuff and get by with it. Remember the old saying, "One bad apple will spoil a whole barrel of good ones."

Everything is being tried out all over the North by a good many mills, and I guess some of them in the South, when they come to spraying oil on the cotton to give it life and strength. Why should cotton have to be oiled? It certainly was never supposed to be. It is against its nature and no one can go against nature. It is supposed to be used in its natural condition. Good cotton can be bought and it will always pay to buy it. When anyone tries ot stretch short staple and make it do the work of long staple, it will certainly make all kinds of trouble. Mills that are making good cloth and yarn are the mills that are running full time and getting plenty of orders, but they are not doing it by using improper cotton and oiling it to get it through the mill and out of their hands.

What's a cent a pound more for good cotton? Why, that would be saved fifty times while going through the mill Keep the oil out of the cotton and everyone will be better off in the long run.

One man spoke a while ago in Cotton about having a conditioning room for laps. All of the mills with which I have been connected have found it hard to get laps enough to keep the cards going. There is no chance to condition



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them. As soon as they come off of the picker the card tender is waiting to grab them. Furthermore, it would take a long time to condition a lap all the way through. The best idea is to have a conditioning room for the cotton, open up a good large number of bales at a time, and let them stand until they are conditioned in good shape.

Experience (Conn.)

Making Core Yarn.

Editor Cotton:

In the August number of Cotton is an article on napping by Contributor No. 262. In that article he refers to a core yarn made with a fine cotton thread twisted with the roving. This was to be used as a filling yarn in certain goods to be napped, and he says that with this system, the core yarn gives strength while the roving wound around it stands out when the cloth is woven and produces a fine nap.

What I would like to see published in "How Other Men Manage," either by Contributor No. 262 or others, is the best process to prepare filling yarn in the manner he describes. Some say the cotton thread is put in at the card. I wish some one would explain just how this is done and also tell how the cost of this method compares with the cost of a plain thread. I should think that it would be more than a plain thread.

I have made core yarn on a mule, but if Contributor No. 262 can give me a few ideas along a line that is a better way to make it I would like to know that.

T. J. (Me.)

Overcoming Winder Trouble.

Editor Cotton:

In answer to "B. B. P. (Tenn.)," regarding his winder trouble, while I do not run the numbers he is winding—and this should be considered—there are a number of things that will cause his troubles. I suggest that he check up on the following points:

How old are the winders, and are the cams in good shape? Are the dogs worn sufficient to cause too much play at the two points of reverse? Does he keep the oil holes in the cone arbors open, and have them oiled at regular intervals? Has he tried dropping the cone arbor just a little closer to the thread guide, giving the guide a little more control as it passes onto the cone at the points of reverse?

Does he allow the cone, as it fits the arbor, to bear on the small end or the large end? It should be set on the cylinder so the large end will lack about 5/1000-inch of touching the cylinder, letting the small end of the cone bear as it will on the cylinder. It does not matter if it throws over on the little end for the first half-inch, for this will not cause any trouble on the knitting machine. This will relieve the friction on the large end of the cone so it can make its reverse without any drag. Also, in connection with this change, use the largest tension weight, if the yarn is not over 40s for underwear or hosiery. Examine the thread bars to see if they are set so the yarn will not drag on the bottom of the thread guide.

There are some other things he might consider, especially the ball-bearing cone arbor described on page 269 of the January number of Cotton. It might be wise to secure one of these for a try-out.

T. C. T. (N. C.)

Editor Cotton:

Replying to "B. B. P. (Tenn.)," who asked in Cotton for a remedy for crossed ends on the first half-inch of yarn from the cone shell, on Foster winders, and also underwound cones, I would make the following suggestions:

The cone and flange pulley belts should be tight enough to avoid slippage. The cone shells must be true in order to avoid vibration. The cone arbor must be snug on the spindle, and there should be no lost motion when the arbor is in position. The arbor should be perfectly aligned with the driving roll. The cam groove or dog must not be worn. And proper tension on the thread is absolutely necessary. If any one of these precautions is neglected, underwinding will be the result.

Contributor No. 492.

Bunch Builders.

Editor Cotton:

I don't think too much can be said for bunch builders, in reply to the questions of "T. I. P. (Ala.)," which were published in the September number of Cotton.

He asks if there is any point of the construction of goods or yarn that would especially favor or that would prohibit the use of bunch builders. In my opinion, all fabrics would be favored by the use of bunch builders, as all fabrics would be improved in quality by using bunch builders and filling feelers. The improvement is more pronounced, however, as the number of harness is increased; and the fancier and higher value the fabrics are.

While the length of time necessary to stop a frame to install bunch builders depends upon the design, it should not take over approximately one hour.

On 36-inch fabrics, with a proper filling feeler, not over three yards of bunch would be required on bobbins running 20s and 30s.

"T. I. P." asks if bunch builders require extra help in the weave room. Bobbin stripping and the time it requires to adjust the feelers will cost extra, but the improvement is tremendous.

Bunch builders will save seventeen hundred per cent of thread waste. They can be operated automatically with success, and are positively practical.

There are many kinds of filling feelers and bunch builders. The sliding type filling feeler is the best for producing the least waste with a bunch built properly near the butt of the filling bobbin.

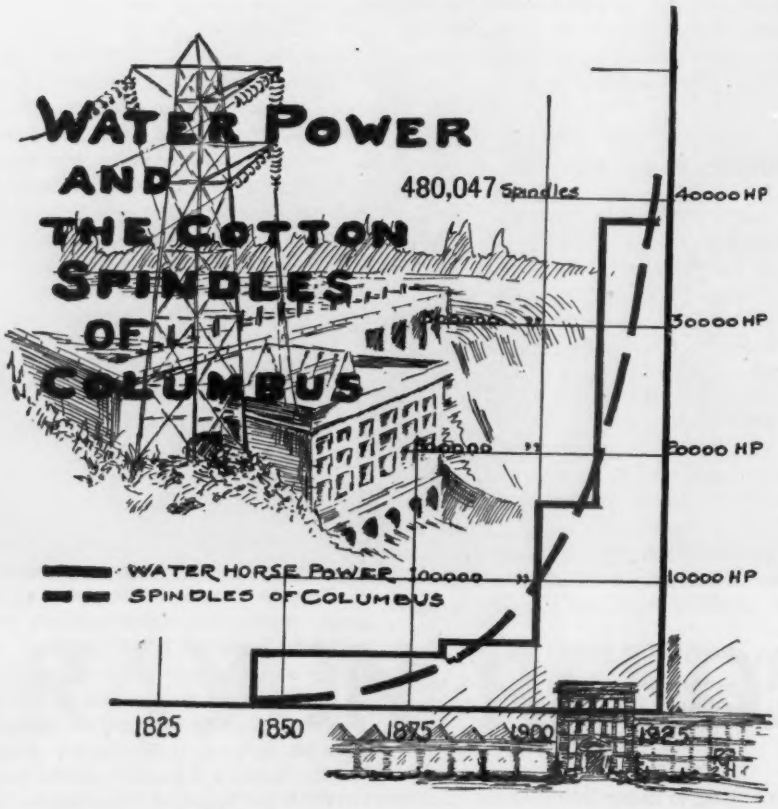
A. S. T. (Tenn.)

Editor Cotton:

Answering "T. I. P. (Ala.)," in the September issue, with reference to bunch builders, I will take up his several questions in order, answering them by separate paragraphs.

He asks approximately what percentage of weaving mills operate bunch builders. I, of course, have no definite figures on this, but practically all mills that have to match the pick, or, in other words, that use filling feelers, use bunch builders. If the feelers are not used, bunch builders are not necessary.

Answering his second question, I do not know of any point of the construction of any goods or yarn that would especially favor or prohibit the use of bunch builders.



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Spinning frames would have to be stopped about an hour and a half to put on a bunch builder. The bunch is a part of the filling builder on the frame, and the types now used are simple and are very little trouble.

As to the amount of bunch required on bobbins for 20s and 30s yarn, this of course depends on the width of the loom. The usual amount on the 40-inch loom would be about 64 inches of yarn. This would, of course, be increased or decreased proportionately according to the width of the loom.

The installation of bunch builders will not require extra help in the weave room. Also, answering his next question, bunch builders can, and are being operated automatically successfully.

The percentage of thread waste saved ranges from 50 to 75 per cent where feelers are used, against where no bunch builder is used in connection with the feeler.

Answering his last specific question, I would say that bunch builders are indeed practical.

Some mills use a bunch builder where filling feelers are not used. This type of bunch builder is designed to put more yarn on the bobbin, but, in my opinion, is not satisfactory with the filling feeler. The bunch builder used with the filling feeler does not put more yarn on the bobbin as it is necessary to have a full stroke on the traverse after the bunch is made where the feeler is used, and in view of this it is not possible to put more yarn on the bobbin with the bunch builder in connection with the feeler.

Contributor No. 711.

Acetic Acid.

Editor Cotton:

Probably some of the readers in the "How Other Men Manage" section of Cotton would be interested in knowing the difference between acetic acid and pyroligneus acid as both are used for the same purpose. Will say that there is no difference as far as manufacturers are concerned, between the two. Acetic acid, acetous acid, wood acid, tar acid, wood vinegar and pyroligneus acid are the same except in the way that they are made and their clarity. The pyroligneus acid, wood acid, vinegar and tar acid are brown liquors, almost black, and are tarry and dirty. These are the black acetic acids of commerce and are used for manufacturing purposes and are prepared by submitting wood to destructive distillation, whence the name pyroligneus acid. For domestic uses this raw acid is clarified and redistilled into acetic acid. It is also obtained for domestic uses by the fermentation of sugar, molasses or inferior kinds of wine. In the dyeing or printing business acetic acid is generally used for dissolving some of the coal tar colors and in the correction of hard waters, being clean; while the pyroligneus acid is employed in the manufacture of pyrolignite of iron and is sold from eight degrees to fifteen degrees.

In a state of absolute purity it is a solid body at temperatures below 60 degrees F. It has a sour smell and taste, but does not redden litmus paper unless water is added.

The ordinary liquid acid of commerce contains large and variable amounts of water. By a strange peculiarity the specific gravity, or twaddle affords no clue to its real strength, that is, to the percentage of dry or real acid present. An acid containing 79 or 80 per cent marks the strongest, while one containing 99, and one containing only 57 per cent raise the twaddle to the same point, viz., 13 degrees. In consequence, some other standard than specific gravity has to be employed in speaking of samples. Many manufacturers and dealers speak of acetic acid as being of one strength, two strengths, etc., up to seven. This is a remnant of the old excise system. It would be better simply to state the percentage of real acid any sample is warranted to contain. The ordinary range is from 14 to 24 or stronger. It should be colorless, free from turbidity, have no oily or tarry scum on its surface and should leave behind no solid matter if evaporated to dryness. It should give no white precipitate if mixed with a little nitric acid and chloride of barium. If one is formed it indicates the presence of sulphuric acid. If muriatic acid is present it gives a white precipitate if a few drops of nitric acid and a little solution of nitrate of silver are added. Acetate of lead in a large quantity is a frequent impurity. If present, solid matter on evaporaion will always remain. If a few drops of sulphuric acid are added to the suspected sample, a heavy white precipitate will fall if lead is present. It will be observed that, except in exceedingly minute proportions, the presence of lead in a sample of acetic acid proves the absence of sulphuric acid. The presence of mineral corrosive acids, such as sulphuric and muriatic acids (hydrochloric) may be ascertained by moistening a strip of white calico with the suspected sample and evaporating it to dryness at a gentle heat. If such acids are present the tissue will be tendered, or even blackened and corroded, according to the quantity of the impurities.

To detect *free* sulphuric acid, as distinguished from soluble sulphates, a portion may be mixed with a little starch and evaporated down to one-half its bulk. When cold, a drop of the tincture of iodine is added. A blue color indicates the presence of free acids.

Acidimetry will give one the strength of a sample of acetic acid. Acetic acid is used in dissolving certain aniline colors, in the preparation of alumnous and iron mordants (pyroligneus) in the manufacture of soluble acetates, and in the mixing of certain colors in printing.

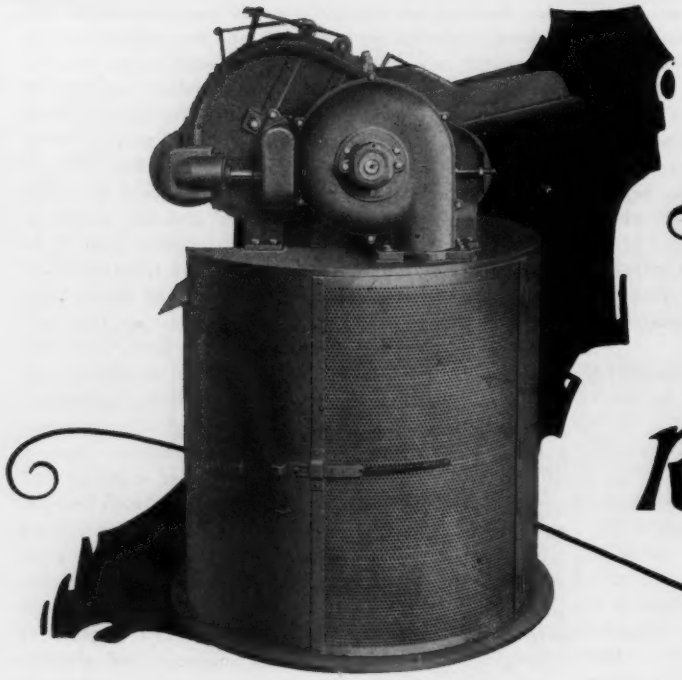
W. B. (Me.)

The Value of Practical Discussion.

Editor Cotton:

The letter from "William, the Watchdog," in the July issue, contains many points of interest, especially the credit he has given the weave room overseers in the improvement of their language. I came up through the ranks of overseer, and I usually found that an overseer got in return what he gave. If he put out rough language, he got rough language in return. Now-a-days they have a more sane and sober way of going through the daily routine. It used to be "knock-down-and-drag-out," but of late years there has come a better understanding of each other on the part of the overseers; a feeling that they must work together for the best interest of all, and maintain loyalty in the organization.

Regarding "William's" suggestion that finishers and cloth-room men should have a part in the textile meetings, I think he is perfectly right. They should have consideration. As he says, they put up the packages, and neatly



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Write for special survey No. 10. It contains information mill executives have found especially valuable.

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ROVING BOBBIN CLEANER

put-up packages attract the attention of any customer, showing there is some pride also in the contents. Neatness and promptness in the shipping room or finishing room convinces a customer of the service of any mill, and that mill gets more consideration when orders get to thinning out.

The "rag-chewing" trips he mentions that the overseers go off on may occur in other States, but in Georgia when a man goes home from a meeting of the Textile Operating Executives, he goes back chewing practical points. I have been to every meeting of this organization since it was started, and I've always had plenty to chew on without resorting to the rag. But it is unfortunate that "William" is not in a position to take in these meetings—although, somehow, down in my heart, I can't help but think he could if he wanted to, for the average mill superintendent or manager is generally fair with his foremen, and if he will work and ask for this favor, I'll bet he will get it.

The requirements he lays down for the overseer are good, for the overseer leads a crowd of people, and like attracts like. Let the temperament of the overseer be whatever it is, that same temperament will prevail through the department, for the operatives will adapt themselves to his methods of conduct.

The last paragraph of his letter deserves consideration. If the cloth-room man has been forgotten he should be given attention, and should attend the weaving discussion meetings. This would give him the inside dope on weaving, and make it easier for him to discuss the effect of defects in weaving when the cloth gets to him. I have taken my cloth-room man to the weaving meetings, and once took my slasher-room, man, and it was a considerable treat. I could see quite a difference in the slasher man's work when he got back. It gave him an idea of how important his job is, and how much depended upon his correctly preparing his mixings, cooking the sizes, etc., and it put real confidence in him for he realized he was an important cog in the wheel. He felt better and appreciated the interest shown in him. It is the same way with any other foreman, especially the cloth-room man. He should by all means attend the weaving and finishing meetings.

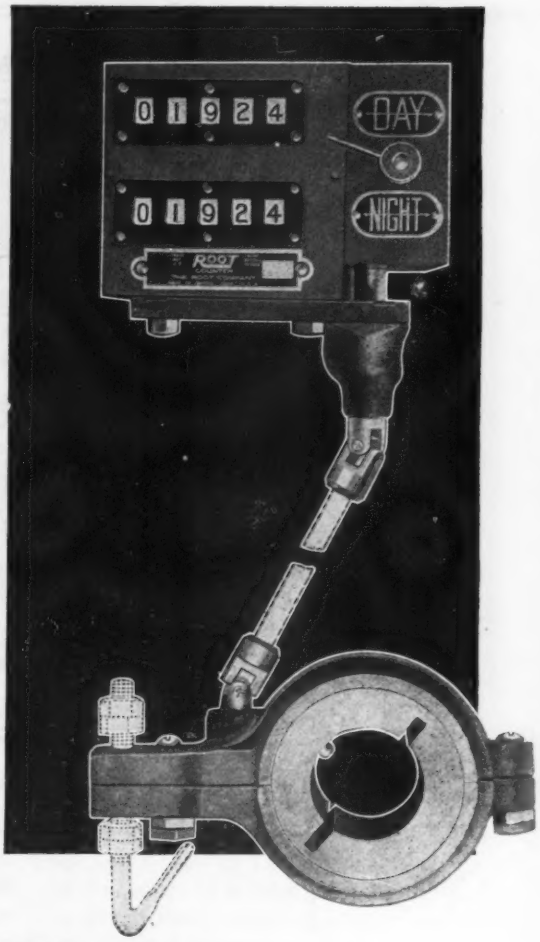
Contributor No. 14.

Rattling Card Comb Boxes.

Editor Cotton:

I wish to write a few words in regard to rattling comb boxes on cards and the causes therefor; also concerning the care of comb boxes and card screens.

First, when a card is new, it will be noted that it runs almost noiselessly, the reason being, that it is a snug fit in all its working parts, the card builders having planned to have this play or lost motion taken care of by means of a thrust screw or take-up screw at the end of the comb box, and if this adjusting screw is never moved, as the lateral wear comes on the oscillating working parts of a comb box, there are sure to be combs that will rattle and slap and will run the comb boxes dry. Now the time to start taking up on those screws to keep them from rattling is while the card is new. Don't wait until the knocking is audible fifty or sixty feet away. The oscillating lever and the half bearings are beaten out by this time in ridges, and before they are started the box had better be taken down and the oscillating levers dressed, using new blocks and



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being careful in fitting them to see that the sliding surface is a perfect fit in its slot. Use Prussian blue and get them as true as in fitting an automobile shaft.

If new blocks are just put in and not fitted, the box will heat and knock again in a few days and the oscillating levers will begin breaking. Now I am referring to the make of card that uses a forked oscillating lever, as most of them do, but the Whitin card is different. This make of card has a round shank on the lever and a sleeve bearing that telescopes as it oscillates through the sleeve.

Right here I want to say that a good card grinder is not a lazy man, and a lazy man will never make a good card grinder. A good grinder is worth as much to a mill as is a good second hand; he will detect a knock in the comb box and he will take up on the thrust screw. Sometimes it is necessary to take up on the opposite end of the comb, on the bearing at that end, and in so doing, it should be gone about as carefully as though scraping in a crank shaft bearing on an automobile. Use blue or lamp black and level the comb with a true level before starting. If, while the cards are new, and after running a few weeks or months, there happens to come a slight knock, there and then a level should be put on the comb and its bearings brought to a true fit. Don't wait until they are worn out. After these cards have run a year, as each card is being ground, take the comb box off and empty it, and as most mills now have compressed air around the plant somewhere, take these comb boxes to a place where they can be thoroughly cleaned and washed; then blow them out and clean out all the oil holes, oil channels and put the box back, seeing that it is leveled and truly fits up and new oil is put in. By so doing production on the card is not lost, for it is being ground anyway.

I do not mean that a man can go in a mill which has been running for several years and get results like this, for there are too many rooms butchered up. Suppose we start a new engine and just merely let it run, it doesn't make any difference how much oil is used it is going to wear, and the moment it begins to knock if it is not keyed up on the cross head, or the pin or disk, whichever it is knocking, by and by flat bearings and flat pins will result, and the only remedy then is to turn the pins around. Now I do not mean to key up too tightly, for this will cause the boxes to run hot, but to get results it must be taken up gradually, a little today and a little maybe tomorrow until the noise is brought back to normal. A perfect running comb will make a noise due to its fast oscillation, but it is a dull, dead, roaring sound and not a rattling and knocking sound. I do not blame the superindendent for being annoyed at such a noise, for it is a nuisance, but it can be stopped if it is gone about in the manner I have mentioned, and in a few months time the oil bill will be reduced, the comb boxes will run cool and the superintendent will smile and want to call you out in the hall or somewhere where it is quiet and talk to you.

I have already written more about this subject than I intended. I did want to say a few words concerning the care of card screens and how essential they are to this part of the card in getting good results from the cards, but I will take that up later. I am not trying to tell the fellows something that they do not know, for every good carder knows what I have been talking about. I am writing this in order to help the card grinder, and no doubt he will

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appreciate it if he is looking forward to advancement.

J. F. L. (ALA.)

Gassed Yarn.

EDITOR COTTON:

Here is my opinion in answer to "Bert (R. I.)," who wants to know what effect gassing a yarn has on the break and size as compared with the same yarn previous to gassing:

The lint on the yarn that is being singed off has no strength value, therefore gassing does not affect the strength, but a loss of from two to three per cent in weight will be shown on well gassed yarn. CONTRIBUTOR No. 492.

Printed Denim.

EDITOR COTTON:

I am enclosing herewith a sample of printed denim and would appreciate having one of your correspondents indicate through the "How Other Men Manage" department the most practical way to finish this class of material so as to match the finish on the sample. These goods come 37 inches in the gray and are finished 34 inches to 35 inches.

A. C. (N. C.)

EDITOR COTTON:

In reply to "A.C . (N. C.)" would say that the denim enclosed is better if singed on the face and then scoured and soured and dried before dyeing, but it may be dyed (and often is) direct from the bale in 1,000 yard lots, without either singeing or boiling. If it is scoured first the following is the operation:

Scouring:—The goods being first sewed together in batches, say of one bale or 1,000 yards each, on trucks, are singed on the face and run at the same time through boiling water onto rolls, they are then run through *cold* water from one roll to another. They are next run through malt liquor or diastafor at about two degrees twaddle, and the heat must not get over 110 degrees F., and allowed to lie four hours or longer. They are then run twice through boiling soda (60 per cent of caustic soda and 40 per cent of soda ash), allowed to lie four or six hours, or all night *between* boils. Then wash and sour at 1½ to 2 degrees twaddle. Allow to lie two hours anyway, then wash well, mangle through cold water containing ammonia, if necessary, to neutralize all acid; then dry before dyeing. All of these operations are conducted at full width and in the roll form. Or it may be conducted direct from the bale and without any scouring or singeing or any other frills. Scouring, however, makes a better job and takes out all the motes, etc., from the cloth and it will take the printing color better. After dyeing in each of the above ways, whichever the superintendent thinks best, the goods should be dried and finished.

These goods must be starched on the back on a two-bowled mangle if possible, though they may, if low goods and unscoured, be run overhead in the starch and run on a three-bowled starch mangle. The starch should be made as follows:

80 pounds	Yellow Dextrin
80 pounds	Glauber Salts
2 gallons	Oleine Oil (50 per cent)

Water must make 100 gallons of starch after boiling. The goods must be then dried and stretched to full width either on the cans and the stretcher or on both combined—the straight away tenter is enough. See that the threads are straight and that the goods come damp onto the tenter. The goods must be run into trucks and all seams laid out in this operation. The goods are allowed to lie and cool and are conditioned. The seams are now cut out and *pasted* together on the pasting plate. The rolls are then wound up in their original size, but the pieces are pasted together instead of sewed. Then they go to the printing machine and are printed and dried (i.e., on the face), then cooled and conditioned on the damping machine and allowed to lie for two hours and then stretched to full width on straight away tenter and thus broken down and are ready to fold up. There is no callendering at the finish necessary.

The Glauber salt is added to the starch to weight the goods. Glucose may be also added to weight, but it has a tendency to soften. I hope that this may be what "A. C." wishes, or at least be of some help to him. W. B. (ME.)

"Dog Days" and Production.

EDITOR COTTON:

I read with interest the discussions in "How Other Men Manage," and have gained some valuable ideas therefrom, and I am truly glad the day has come when practical mill men will swap ideas with each other and not try to keep good things as secrets from their fellow men.

I have been asked to write a short letter on dog-days and their effect in the mill, and how to overcome it. You know, most of us overseers and superintendents put on a long face and get nervous as the so-called dog-days approach. I will try to tell how I overcome this trouble.

Last year I couldn't tell by the running of my work when the dog-days got here, and for the past five years our mill has run just about as good in the summer as in wintertime, although a little under production in the summer months on account of the extra twist we put in. For example, on our 4.00-hank frames, I am putting in five teeth more twist than the catalog calls for. Speaking of books, I want to say right here that book knowledge is all right if you have enough practical experience to go along with it. But if an overseer sits in his office and reads the daily papers and works out cross-word puzzles, expecting books to keep his job and the work running good, he'll be disappointed, for when the weather gets hot, or a damp spell comes along, books won't help very much.

If a man wants his work to run good in the summer, he should commence early in the spring, first, by taking out all the steel rolls on the fly frames and cleaning them thoroughly, also the roll stands, putting the rolls back into place and gauging them to see that they are properly set to correspond to the staple used. Then clean and put in the top leather rolls and gauge them to correspond with the bottom rolls. Then clean the top and bottom carriages, and put new grease in all the bearings, seeing that the fly-frames all are in perfect shape. Then watch the mixing at the opening room and see that the white waste is mixed properly, keeping a close watch on pickers, cards and drawing. I scour my drawing rolls every other week. I watch the humidity and keep it as near one thing as I can.

Now we come to the most important thing of all—the

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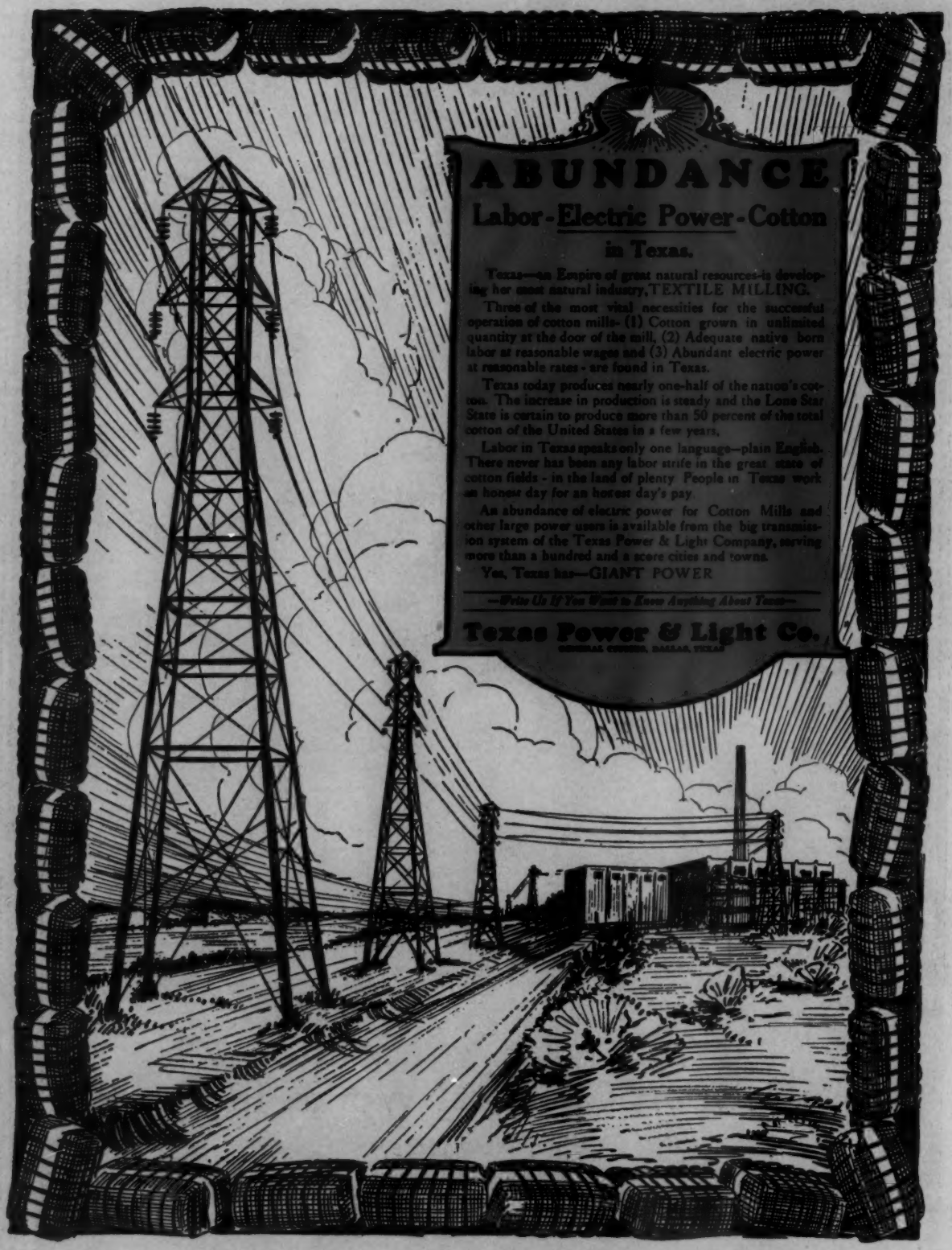
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Three of the most vital necessities for the successful operation of cotton mills- (1) Cotton grown in unlimited quantity at the door of the mill, (2) Adequate native born labor at reasonable wages and (3) Abundant electric power at reasonable rates - are found in Texas.
Texas today produces nearly one-half of the nation's cotton. The increase in production is steady and the Lone Star State is certain to produce more than 50 percent of the total cotton of the United States in a few years.
Labor in Texas speaks only one language—plain English. There never has been any labor strife in the great state of cotton fields - in the land of plenty. People in Texas work an honest day for an honest day's pay.
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twist. Good judgment must be used here to suit each case. If I were using the twist gear that figures for my different hank rovings, my work wouldn't run now, not saying what it would do in dog-days. W. C. H. (Ga.)

High and Low Card Flats.

Editor Cotton:

In the June issue of Cotton there were some very interesting ideas in regard to high and low eard flats brought out by "Bob (S. C.)." There is only one better method, that is, to grind uneven flats on a flat grinding machine which is made especially for that purpose. In summing up his article, he seems to dwell upon the subject of how to make uneven flats straight. I was somewhat surprised to note that he did not bring out a few points regarding the prevention of uneven flats, as "An ounce of prevention," as the saying goes, "is worth a pound of eure."

If cotton accumulates on the inside end or ends of the flats, owing to the worn out condition or the improper setting of the flat brushes, this cotton will cause the flats to raise on one end when going over the flat grinding stand. Some flats having this cotton and others not after the dead grinding roll is once set will be the cause of some flats raising more than others, and will cause some to be ground heavier than others. This will cause high and low

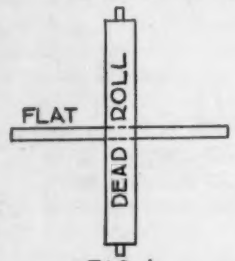

FIG. 1

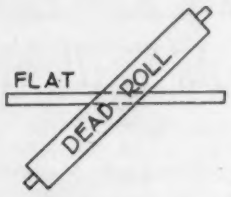

FIG. 2

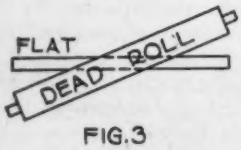

FIG. 3

FIG. 4

flats when setting the flats to the cylinder. This also will cause what I call a "straight taper." For instance, ¼ inch on one end tapered down to 3/16 of an inch on the opposite end.

Let us imagine the dead roll setting and running as shown in Fig. 1. It would be grinding only approximately two inches on the wire. In a few hours you can plainly see that you would have a hollow place in the center of each of the flats. This, I know, is to the extreme, but I am doing it to bring out my point.

In Fig. 2 the dead roll would grind approximately twenty inches in the center, causing twenty inches of hollow wire.

In Fig. 3 the dead roll would grind approximately 34 inches of each flat.

In Fig. 4 we will say that one end of the flat is one-half or even one-quarter of an inch ahead of the other end when going under the dead roll.

With the foregoing illustrations I think you can plainly see my point of view, that is, the center of the flats get more grinding than the ends, and in six months under such conditions the flats would be found to be hollow in the center. It will be noticed when setting the flats to the cylinder with a ten gauge that a twelve gauge can be inserted in the center.

The way to prevent hollow places in the flats is by tightening the chains with brackets made for them or adjusting the dead roll stands. Adjust these until the flats are parallel with the dead roll. The way to determine this is to stand on a box about two feet high and squint along the back side of the dead roll. This should be done about every six months to keep the cards in good order.

Now after grinding five or six cards where the flats were out of line with the dead roll it can be plainly seen that the dead roll is hollow in the center and high on the ends owing to the fact that the center has had to do considerably more grinding than has the ends.

Then the grinder comes along and takes this dead roll and puts it onto another card which has a new or perfect set of flats and begins grinding them. These flats will be ground low on each end and high in the middle because the ends of the dead roll strike the flats first or before the center.

Now you can easily see how a room full of cards could be ruined if they were not properly taken care of.

K. F. F. (Mass.)

Setting Cushion Plates on Combers.

Editor Cotton:

In reply to "Joe (Mass.)" concerning cushion plates on combers I am submitting herewith my opinion in the hope that it may be of some assistance to him.

In working on Whitin combers I have found the same difficulties that "Joe" has had and will tell how I managed. I consider the lining up of the cushion plates of more importance than the angle of the knives, so I set No. 4 delivery with the 1 7/16 gauge, 37 degrees angle, then when I came to No. 3 delivery I moved the angle to get the cushion plate to line up with the 1 7/16 gauge and so on through the comber.

I find a variation of angles, but in averaging them up it will be found that this variation will not effect the percentage to speak of.

What do other readers think of this?

Johnson (Conn.)

Card Settings to Reduce Fly Waste.

Editor Cotton:

In the June issue of Cotton I noticed that "E. A. G (N. H.)" asked for suggestions on card settings. He claims that he is taking out too much fly waste and has asked some of your readers for suggestions that will help to remedy the condition.

I would suggest that he set his flats to a nine gauge; cylinder screen 29 at the back, 34 at the bottom and 68 at the front; licker-in screen, 34; feed plate, 12; and mote knives, 12 and 10. By changing the setting of the feed plate from 10 to 12 it will increase the breaking strength of the yarn about three pounds. He states that he set his mote knives 7 and 5, which is altogether too close and is

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the main reason for the excessive amount of fly waste which he is getting. As previously stated, I would suggest trying 12 and 10, which I think will reduce the fly waste to the desired amount. If not, draw off to 14 and 12. I notice that he did not give the setting of the licker-in to the cylinder. If he had a loose setting between the licker-in and cylinder this would allow a great deal of the cotton to go over again which would be thrown between the mote knives and thus increase the amount of fly waste.

With a close setting the cylinder wire gets a better grip on the fibers and carries them over the top between the flats and the cylinder. I would advise setting the licker-in to the cylinder with a five gauge. K. F. F. (Mass.)

Some Waste Figures.

Editor Cotton:

In the June issue of Cotton I note a very interesting article by "H. D. M. (Ga.)" entitled "A Systematic Method of Reducing Waste." This is good dope all right, but I would like to see his figures where he figures a mill using 120,000 pounds of raw material to produce 100,000 pounds of finished goods will cost $250.00 per week to rework three per cent of their reworkable waste, which figures he gives in his article.

I will give you herewith some actual figures taken from a mill getting a little over 200,000 pounds through the spinning. I will figure two-thirds waste as coming from carding and one-third from spinning. My carding cost includes the speeders.

19,500 pounds total reworkable waste per week.

1/3 of 19,500 = 6,500 spinning

2/3 of 19,500 = 13,000 carding.

Carding cost through the speeders at 2.475 per 100 pounds + spinning cost at 1.456 per 100 pounds, = 3.931, total cost of carding and spinning.

3.931 cost of carding and spinning × 6,500 = 25,551.5.

2.475 cost of carding × 13,000 = 32,175.

32,175 + 25,551.5 = 57,726.5

57,726.5 ÷ 100 pounds = 577.265, total cost per week for all reworkable waste.

Three per cent of $577.26 = $17.31, which lacks a lot of being $250.00. W. P. (N. C.)

Winding on the Roving Frame.

Editor Cotton:

I am under the impression that "Wash (R. I.)" in his article, "A Fly Frame Question from Wash," believes that some bobbins will wind on more roving than the others on a bobbin lead frame.

I claim that a bobbin lead or a flyer lead has nothing whatsoever to do with the amount of roving wound on a bobbin. In either case, if the bobbin revolves a thousand times and is 4½ inches in circumference, there will be the same amount on all bobbins, with the exception of a few which a speeder tender may have pieced up. The reasons that the bobbins do not run out together is due to the the stretching of the roving in the creels, which may be from a number of causes. For instance, the two top rows and the bottom row have a longer and harder pull than the middle row and therefore will stretch more.

Moisture on creel rods, which creates a dragging effect, flat or worn out skewers. the eye in the traverse rod plugged with cotton, the flutes in the back steel roll worn, a loose cot, hollow place, oil on the cot or a hard running top roller will also interfere. C. I. K. (Mass.)

Cure for Yarn Breaking at the Spoolers.

Editor Cotton:

In the January issue "C. and S." stated he was having trouble with his 14½s yarn breaking at the spoolers, this yarn being made from a 17¾-ounce lap and 75-grain card sliver. You have since published several replies.

I agree with those who say his lap is too heavy. His front roll speed of 115, I note, is under standard. I have been a carder and spinner myself, and I have never run a lap of 17¾ ounces per yard on numbers as low as 6s, much less on 14s. I believe his trouble is there, and also that his 75-grain card sliver is out of reason. I venture to say there is no drawing frame made in which the rolls will draw evenly and make a smooth parallel sliver out of six ends up of 75-grain sliver.

My advice is that "C. and S." reduce the weight of his lap to 14 ounces per yard, and regulate the drafts accordingly. He may say, "Oh, but I can't do this, for I couldn't keep up in the picker room." Well, I don't doubt that either, if he hasn't got pickers enough, but I will say if he can cut the drawing sliver to 60 grains he will see a wonderful improvement, unless the gears are broken and have a tendency to skip a tooth now and then between the crown and back roll gearing.

There are many other causes for yarn breaking at the spoolers, but I say when we begin to go after production and lose sight of quality we begin to lose both quality and quantity. I suggest that "C. and S." try these ideas, and stop all the waste he possibly can from going back to the picker room. J. F. L. (Ala.)

Spinning Room Pointers.

Editor Cotton:

I usually keep my back numbers of Cotton to have the pleasure of going over them occasionally. A few days ago I re-opened the June, 1924, issue and read again the questions "G. E. M. (Mass.)" asked.

First, "What results do you find of using rings which have been turned over?" I have turned over rings, and where one side had not been worn at all, I have found I had regular good new rings. Of course I had them cleaned in good shape first.

Second, "Which do you prefer, No. 1 or No. 2 flange rings, and why?" I prefer No. 1 flange rings. The traveler companies can furnish a better traveler with this because the circle is smaller and it will make the traveler much stronger. The wear might be the same. I have never paid attention to the wear but the strength is better as the circle is smaller.

Third, "Have you ever used top-rolls covered with any other substance than leather; if so, how do they compare with leather-covered rolls?" I have tried rolls covered with rubber, which proved to be annoying, even at the beginning, as the rubber has a tendency to loosen and slip off the rolls. I have tried cork-covered rolls. These have

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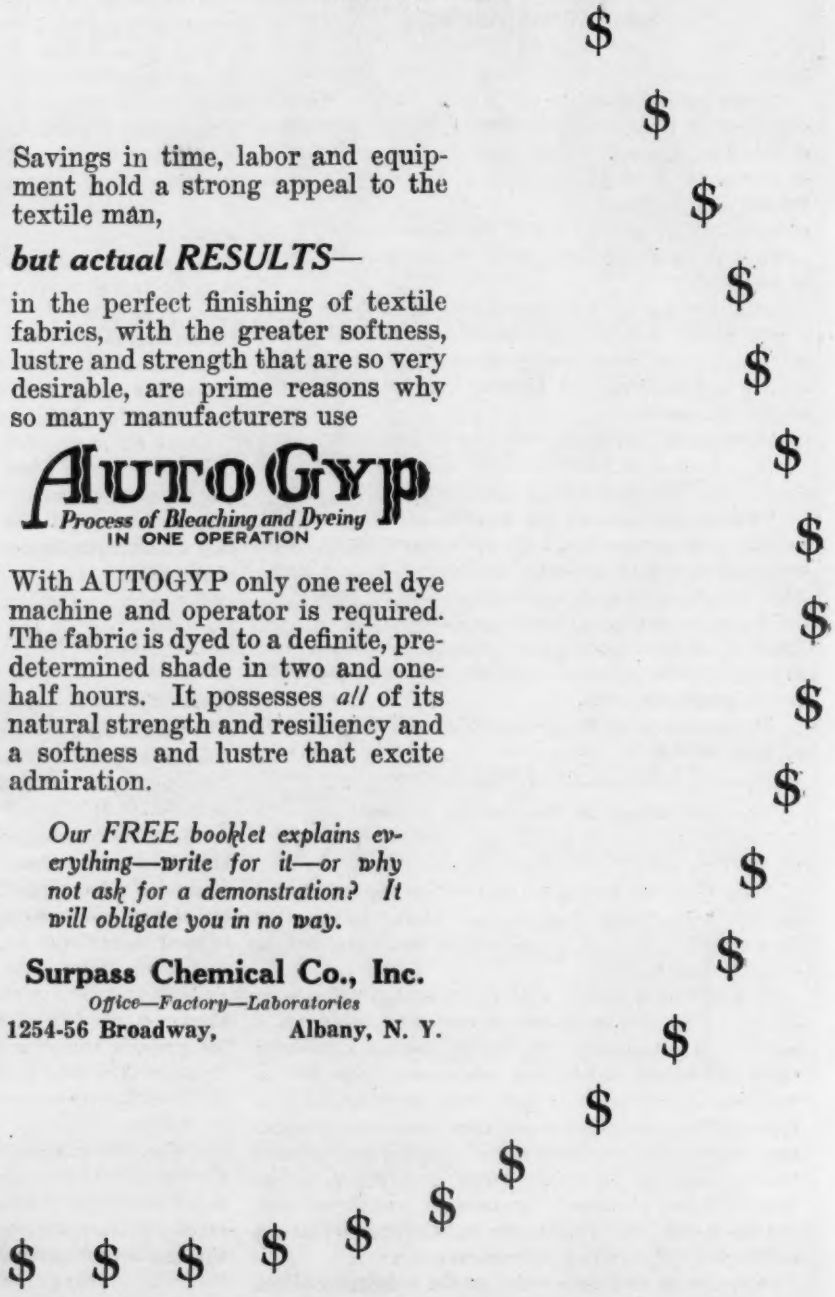

proved to be very good, except when a spinner makes a slip while using the brass hook or picker and the picker touches the cork, it will make a bit of a hole, and if running fine counts, the damaged roll will be just enough to break that fine count when the end reaches that spot on the roll. Leather-covered rolls are my choice so far.

With reference to filling wind for warp yarn, will say I made a test on this. I took two frames of the same counts, say 23s, and used the same draft gear and same twist gear, and I found in reeling that off the filling wind bobbin I took about 665 yards less than off the warp wind. The ring rails had been looked over closely and the rail run as high as possible. We made a bobbin much harder on the warp wind than on the filling wind. The waste proposition was not considered, as we made only a few bobbins for a test. This yarn was spun on a two-inch ring.

As to round- and square-pointed travelers, I have found that the square points are better for me here. When I came here, round points only were in use. We run from 40s to 95s filling and 40s to 70s warp. I got samples of the square points and tried them, and now I don't want anything else.

I hope this will start the ball a-rolling, as we said in the army. I am a young man and want to learn every day I should be glad if somebody would take a shot at my answers. I am out to get pointers; who is not?

J. U. (R. I.)

Fluted Top Rolls.

Editor Cotton:

In the March issue of Cotton I read with interest the discussions by "A. B. (Ga.)" and "L. D. (Mass.)" concerning fluted rolls; also in the May issue the letter from "Christy (Mass.)" on the same subject, which I think cover pretty thoroughly the question as to the cause of fluted rolls.

Up to six months ago I had a very good run on rolls, when we began to have trouble with fluting. We noticed that the rolls which were coming in showed poor workmanship; we called on the roller man and showed him the work. He stated that he had run out of the regular quality of leather which we had always used (the best imported) and had been substituting with the best he could get, it being impossible to get the former. The substitute was a little heavier, so he tightened the cushion, thereby improving the workmanship, and our difficulties were overcome.

Inattention to cleaning rollers and saddles, and lack of oil; also a poor oil will cause them to heat and cause the rolls to flute. Very sharp flutes will have a tendency to flute the leather rolls.

I heard a spinner state that he had known fluting to be developed in a curious manner at times; new rollers would be fluted as fast as they were put in, with apparently no cause for it. Afterward they would go on straight for a time, and the only way found to overcome the difficulty was to wait until the mules with their fluting peculiarities were not on and then put a good number of new rollers in at once. At times everything would be examined, or better leather would be tried to remedy the evil, but without success, the only feasible reason being that of a large development of electricity, which was detrimental to the leather. Roller coverers will tell of certain machines which always give them more trouble than others.

G. R. K. (Mass.)

Uneven Winding on Fly Frames.

Editor Cotton:

Please allow me space in your valuable paper to reply to my friend "Wash (R. I.)" in reference to his question in the June issue of Cotton.

There are many points that will cause the roving to run out, and a few of the causes are: 1st—Irregular diameter of bobbins; 2nd—Bad top rollers; 3rd—The variation in the finished lap.

Take the bobbins.—No doubt "Wash" at different times has walked through a card room and has seen at the beginning of a set some of the ends run so tight that they would sometimes break, while other ends on the same frame would be slack and kink at the nose of the flyer. This is almost sure to result where new and old bobbins are used, and does result in a few coils of roving being left on those bobbins where the ends were tight at the start, this being due to the stretch brought on the roving by the surface speed of the larger bobbins being greater than the speed of the smaller bobbins.

Take the rollers.—Most, if not all mills, get every minute's service out of a roller that is possible, and where rollers have been used for a long time, that is, the middle and back rollers, they will become smaller in diameter where the sliver traverses along the rollers than at the ends of the boss where the sliver does not come in contact with the roller, and when those parts of the roller not touched by the sliver rests on the bottom roller will take pressure off the sliver, thus allowing the front rolls to pull the sliver and shorten the draft, causing the roving to be a bit heavier, and as the bobbins fill will cause the end to run tighter, thus stretching the roving. A few coils will be left on that bobbin even if the frame is allowed to stand until the last bobbin is in the creel and the frame started.

I said the finished lap played a part along this line. As the lap varies, so will the card sliver, and if one has two or three processes of drawing there will be some variation in the finished drawing sliver, and as there is no doubling between the drawing and slubber this same variation will be in the slubber roving. Take the following example:

Weigh two yards of sliver, one yard weighing 60 grains and the other weighing 61 grains, the slubber having a draft of .5. One yard of slubber roving made from the 60-grain sliver will weigh 12 grains, while that made from the 61-grain sliver will weigh 12½ grains per yard. This weight will increase the surface speed of the bobbin and will cause stretch, which means that more yards of roving will be on the bobbins weighing 12½ grains per yard than will be on the bobbins weighing 12 grains per yard.

There is one thing that all men should remember, and that is, any variation in finished sliver will cause a variation in the weight and length of the slubber roving. To prove my statement—just run a frame until the flyers have all they will take without touching the roving; then examine by moving the flyers by hand; it will be found that some will move the bobbins while others will not, even though the flyers are the same gauge.

T. A. A. (S. C.)

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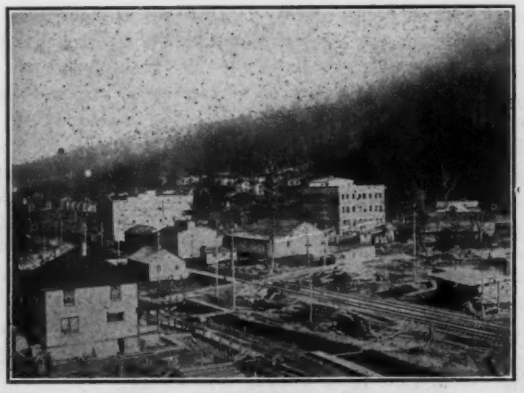

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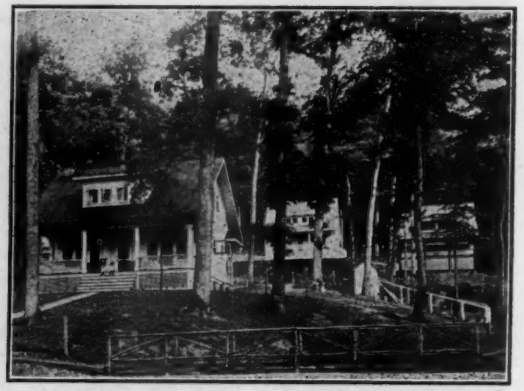


Beautiful Homes for Plant Officials

Making 14½s Yarn from 1.53 Roving.

Editor Cotton:

If "R. C. H. (Ga.)" wishes to make 14½s yarn from 1.53 hank roving I will give him the whole thing here in figures from our own gearing.

We have a twist constant of 783.36 and a draft constant of 268.80. He does not state whether he wishes to make 14½s with single or double roving. Here is the way we do it:

14.50 ÷ 1.53 = 9.47 draft.

268.80 ÷ 9.47 = 28 draft gear.

Standard twist per inch of 14½s yarn = the square root of 14½s which is 3.808 × 3.50 = 13.33 turns per inch.

To get the twist gear for 14½s yarn:

Twist constant 783.36 ÷ 13.33 = 58 gear, or 59 will do as well.

Twist constant 783.36.

Draft constant 268.80.

Draft gear 28.

Twist gear 58.

Traveler (round point) 6. J. A. H. (Conn.)

Inserting Twist in Yarn.

Editor Cotton:

From time to time I have read a good deal of dope discussing the traveler, spindle and twist on a ring spinning frame.

I want to request that the readers of Cotton, if they do not know as much about this subject as they would like to know, to read this letter over two or three times, or read it until they think they have the writer's side of the subject. Then if the matter is not clear to them they must not blame me, because I am going to do my best.

I will begin by saying that the same number of turns of twist are not inserted throughout the building of a bobbin on a ring frame. When spinning a warp-wind bobbin, less twist is inserted when the winding is started than when the bobbin is nearly completed. It is true, as some say, that the traveler does not insert the twist in the yarn, but it is also true that the twist in the yarn corresponds with the speed of the traveler. As a matter of fact, the twist in yarn spun on a ring frame is dependent on the number of times that the point of contact of the yarn with the bobbin passes around the spindle. Suppose, for instance, that the yarn were fastened to the bobbin. Then the number of turns of twist inserted in the yarn would be exactly equal to the number of revolutions of the spindle. As a matter of fact, however, the yarn is not fastened to the bobbin, but the point of contact of the yarn with the bobbin is constantly receding in accordance with the action of the traveler in winding the yarn around the bobbin. The number of times that this point of contact passes around the spindle governs the amount of twist in the yarn, and this speed corresponds exactly with the speed of the traveler, although the traveler does not actually insert the twist. The twist is inserted by the spindle.

What I mean by the expression "point of contact" is the exact point where the yarn is going onto the bobbin. As this point of contact is headed, so to speak, in the opposite direction to that which the bobbin is turning, this causes the bobbin to lose ground; that is, every time one coil of yarn is wound on, one turn of twist is lost. Catch that?

Now just a little more and I will leave it with you. The twist in roving made on a fly frame is the same from the start to the finish of a set. Why? Because the speed of the flyers is constant. Therefore, this point of contact we have been talking about is constant, the point of contact and eye of the presser being face to face or side by side at all times.

Think it over!

W. G. (Ga.)

Figuring the Filling Counts.

Editor Cotton:

In reply to "J. T. (N. C.)," whose question appeared in the May issue. His problem is: "The cloth is 70x76; 38 inches wide, including selvage, 70s warp, 12 yards to the pound. What count of filling must be used?"

First let us find the average counts by a short method I have at hand: Sley plus picks, multiplied by the width and yards per pound, divided by 760, equals average number.

$$\frac{(70 + 76) \times 38 \times 12}{760} = 87.6 \text{ average number.}$$

Then add the sley and pick and divide by the average number. Divide the sley by the counts of the warp. Subtract the result thus obtained in the second case from the result obtained in the first, and divide this into the picks per inch. The answer will be the count of filling required.

$$\frac{70 + 76}{87.6} = 1.666$$

76 ÷ 70 = 1.085.

1.666 — 1.085 = .581.

70 ÷ .581 = 120s counts of filling required.

No allowance has been made for contraction.

W. R. (Mass.)

Prefers Unhumidified Picker Room.

Editor Cotton:

I have been following very closely the discussions in Cotton, but I do not see why any practical carder or superintendent would want humidifiers in the picker room, not that I want the cotton all free from moisture, but just enough in it to hold it together and keep the lap in shape.

I suppose there are exceptions to this in case anyone is handling dyed or bleached cotton in the pickers, then perhaps it is necessary to have moisture put into the cotton to handle it.

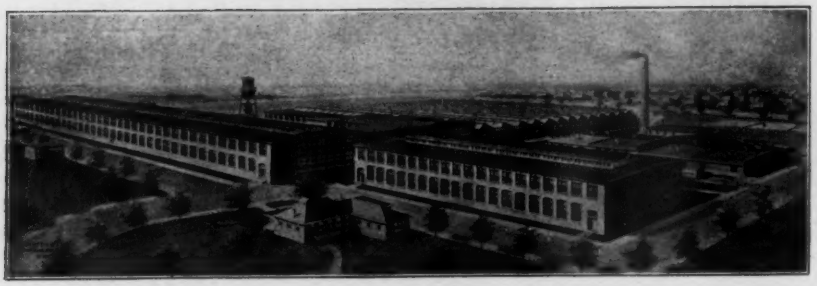
In our mill we have no humidifiers in the picker room, though in the card room we keep a general relative humidity of 50 degrees.

In the combing, drawing, slubber and intermediate room we keep a relative humidity of 55 or 60 degrees. No matter what the condition is outside, if we can keep our humidity right, we never have any trouble with the sizing or running.

In making this statement I do not mean that our sizings do not vary; they do, and as far as that is concerned, always will, but we are able most of the time to keep within a good average.

JUDSON MILLS

GREENVILLE, S. C.



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This subject can be discussed further, and I hope to see opinions from other correspondents in later issues of Cotton.

Bob (Mass.)

Study for Success.

Editor Cotton:

I have read articles in Cotton for the past two years on the difference between the college trained man and those who did not have college training. A point I want to see discussed is, whether it is an advantage to get one's training under a father or brother?

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This means that NON-FLUID OIL gives constant and positive lubrication.

And that NON-FLUID OIL keeps in the bearings and off the product—an important point when you consider the loss sustained by many mills through stained goods.

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You Can't See It—

But It's There!

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MOLONEY Leather Belting

Moloney Belting is manufactured by a company that has been making leather belting for over a quarter of a century. To a man its personnel knows belting and the things that should, or should not, go into it—or be done to it—to produce a quality product.

Live leather; toughness; enduring strength; a real pulley grip; protection from the disintegrating effects of long, hard usage and the elements—these are the things that have made Moloney Leather Belting famous in every industry where belting is necessary for transmitting power. So, when you need belting, insist upon Moloney—*and get the utmost.*

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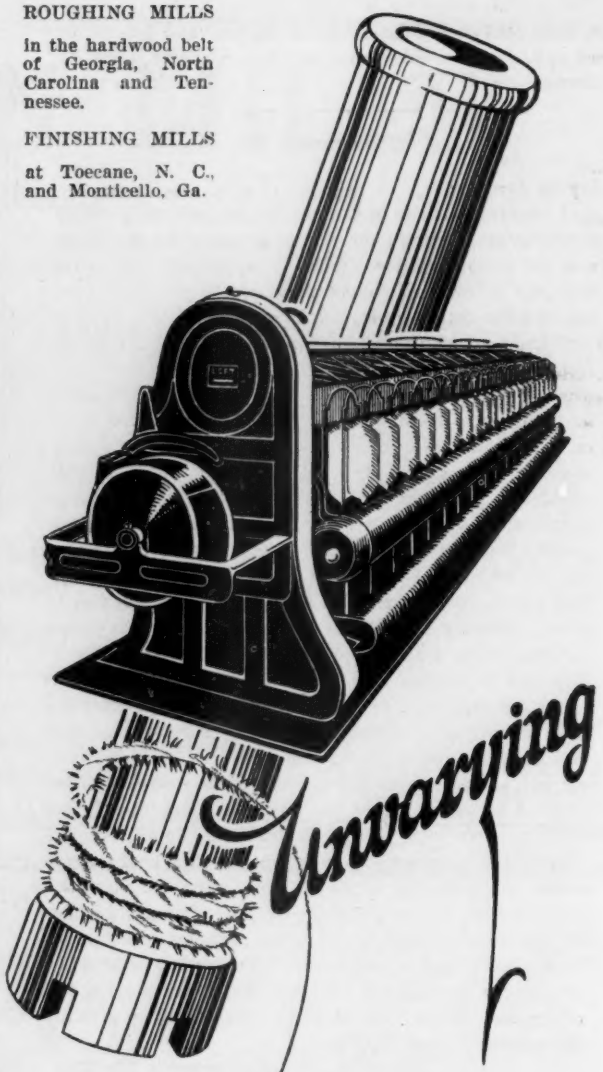

Unvarying

Jordan

PRECISION

Bobbins

PRECISION in bobbin-making is one of the notable facts three generations of Jordans have established in the cotton-spinning industry; but not the only one.

Making bobbins to meet a variety of individual specifications is only secondary in its importance. Among our hundreds of customers, mill after mill demands this from us, too.

Our habit of accuracy qualifies us to make the identical bobbin any mill wants, with an exactness which is unvarying. Unvarying!

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GREENVILLE invites you, Mr. Manufacturer, Mr. Capitalist, Mr. Builder and Mr. Businessman. Just tell us what particular phase of industrial or financial activity you are interested in—we will place before you data relating to your particular wants—all correspondence confidential.

Greenville Chamber of Commerce, Greenville, S. C.

This subject can be discussed further, and I hope to see opinions from other correspondents in later issues of COTTON.

BOB (MASS.)

Study for Success.

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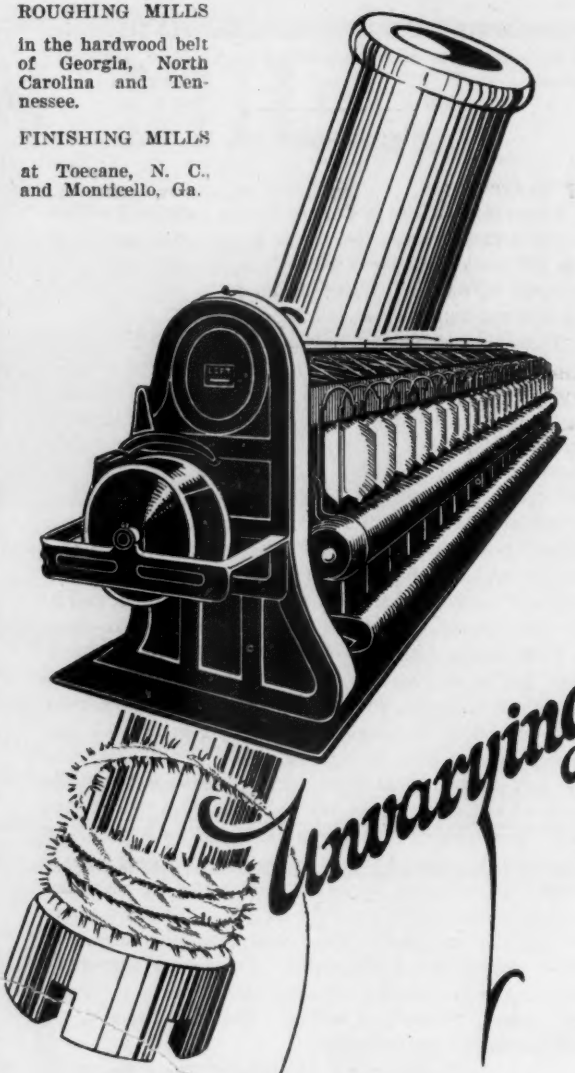

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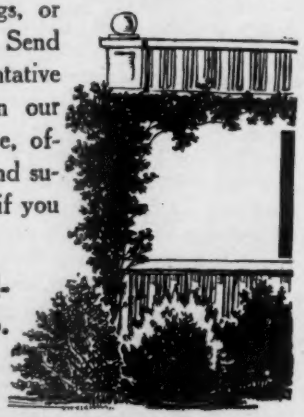
Our landscape service will plan and plant home surroundings, or mill grounds. Send for a representative who will explain our guaranteed service, offer suggestions, and supervise the work if you wish.



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It will cut your cloth, fold the edges—roll it up and give you an exact measurement of every piece of cloth going through the machine.

It saves time, labor, machines and cloth.

YOU ONLY NEED ONE MACHINE where before it required two and you get an extra strip from each bolt of cloth.

It cuts the corners of expenses in every way and leads to more and greater profits.

THE ENORMOUS SAVING WILL INTEREST YOU.

Mail a card for complete information and prices.

When in need of special machinery, write us.

J. A. FIRSCHING, 614 Broad St., Utica, N. Y., U. S. A., Dept. "C."

We went into this very carefully and very thoughtfully, and by planing off the bottom of the feed roll stands we were able to let all of our feed rolls down to the same gauge, but we did not change the pressure on the feed roll on the different styles of cards. However, there is a way to do this and we intend to eventually have the pressure on all feed rolls on the different styles of cards the same.

There are some very interesting things about cotton manufacturing if one will only take the time to dig them up. I believe that cotton manufacturing is now just in its infancy. In other words, it has just been born. Our textile meetings throughout the country, with their many helpful suggestions, are stirring men up and their minds are really digging deep into the genuine worth of what can be accomplished in cotton manufacturing. I believe in evolution. We are being taught more about cotton manufacturing now in one week than we used to hear in a whole year. The time and talent applied to cotton manufacturing is an asset to the mill overseers of today, and I trust that many other things now hidden, can be dug up and used for the good of the industry. A. B. (Ga.)

Double Plush and Velvet Looms.

Some interesting features and developments on their double plush and velvet looms have been announced by Robert Hall and Sons, Bury, Ltd., of Bury, England, manufacturers. The main principle involved in these looms is that of weaving two pieces at once, one above the other. The ground warps for each cloth are separate, and the pile threads are carried from the top to the bottom cloth. The result is a double fabric with the pile threads stretching from top to bottom, separated by means of a cutting apparatus which operates during weaving.

These looms, which have been improved during recent years, are made with varying details to suit different purposes. For many fabrics, two shuttles, one above the other, are actuated at the same time, thus putting in two picks at a time, one in the bottom and one in the top fabric Other fabrics are made with a single shuttle which puts the picks alternately in the bottom and top fabric. Where the twin shuttles can be utilized, increased production naturally results. For certain purposes, a drop box motion at one side is used, the single shuttle being picked alternately. The shedding arrangement is varied according to requirements, chiefly by means of outside eccentric tappets or enclosed box tappets, but dobbies are applied when desired, it is stated.

Generally there are three yarn beams, two for the ground warps and one for the pile warp, the former being regulated by a positive worm and wheel let-off motion, allowing an equal tension from start to finish. This also delivers the pile yarn positively, and in this case the yarn is guided through two suitably covered rollers.

The beat-up is from a crank shaft placed low, out of the way of the yarn, and is connected to the sley by means of crank arms and quadrants. The picking arrangement is underpick, by means of cones, for producing a smooth and gentle pick.

The cutting apparatus has been greatly improved, it is stated. The fabric is stretched between two bars which are adjustable by means of machined wedges and screws

This one thing is certain--Mills that use Lazenby Filling Winders make more money. And it's the kind of money that wouldn't be made unless it was saved.

Here is the way it operates. Winding your Filling on Lazenby Winders before it goes into your shuttle results in possible savings in spinning, twisting, winding weaving and finishing. It is the way to reduce costs. It substantially reduces them in more departments than is possible by any other improvement in the whole mill.

We do not ask you to install Lazenby Winders on the strength of our making this statement. Instead, ask us to submit positive proof in the form of a Testwind Report made from data supplied by you and based on your work.

Fix in your mind that this Testwind of our's is practical. It is for your use; it is right up to mill requirements. It works.

Do this--send enough of your Filling yarn to permit a fair weaving test (at least ten pounds), a piece of Filling such as you use at present, and a shuttle--write us that this is going forward. In return, we will send you your samples in a new form together with the Testwind report.

Write us for anything else you would like to know about.

Lazenby Cops

Since 1902 no Cop Winder has ever been built which puts as much yarn into the shuttle as does the Lazenby Winder. Neither has any machine produced as much Filling per hour.

This means that if you use any Cop Winder other than a Lazenby machine, there is room for big improvement in the condition of your Filling, and this in turn means a big saving of waste and an increase in loom production.

F. A. LAZENBY & COMPANY, Inc.

416 KEY HIGHWAY - - BALTIMORE, MD.

Southern Representative. W. A. Kennedy, 1106 Johnson Bldg., Charlotte, N. C.

Canadian Representative: C. M. Cudlip, 35 Robinson St. Hamilton, Ont., Canada.

Leather Belting at Its Best

SLIP-NOT

Nothing would please us more than to have you prove to your own satisfaction the merits of **SLIP-NOT** Leather Belting.

Compare it critically with any other belting. Watch its performance on hard drives; observe its wear-resisting and water-proof qualities; note, too, the ease with which it delivers a full measure of power from the very day of its installation, due to a perfect pulley surface.

We feel quite sure you will agree with us that SLIP-NOT possesses every desirable attribute for really efficient power transmission—and that you, too, will come to the conclusion that *there isn't a finer belt made.*

The **SLIP-NOT** *dealer in your vicinity will be glad to tell you more about this quality belting*

SLIP-NOT BELTING CORPORATION
KINGSPORT, TENNESSEE

TRANSPORTATION

Excellent Railroad Facilities with Six Seaport Connections

Three trunk line railroads and one intra-state road operate eleven separate lines out of Columbia. This is the only city in the Southeast having two direct lines of railroad to each of the six South Atlantic seaports.

In addition to the rail facilities, Columbia is a highway terminal, with paved highways radiating in all directions and accessible from all important points in the Middle West, the East and the Southeast.

To the textile manufacturer who is looking for a southern location with adequate rail and seaport connections to get his products to either home or foreign markets in the quickest time—there can be no better location than Columbia.

Write for a copy of "Columbia-Unlimited"—it gives detailed information of Columbia and its many advantages.

WM. LYKER, Jr., Secretary
COLUMBIA CHAMBER OF COMMERCE

COLUMBIA

SOUTH CAROLINA

LABOR
An ample supply of labor—white, intelligent. Content to work for reasonable wages. Majority skilled in textile work. Plenty of unskilled labor available.

POWER
Cheap power is available from hydro-electric plants operating from nearby streams. Only one-half of the 75,000 potential H. P. is now being utilized.

TRANSPORTATION
Four railroads operating 11 separate lines offer ideal distribution facilities. Two direct connections to each of the six South Atlantic seaports.

WATER SUPPLY
An abundant and excellent water supply is furnished by the city. Various analyses show both city and branch water are applicable for bleaching and manufacture of Rayon.

CLIMATE
An ideal year 'round climate of 63.5 degrees. Heat prostrations unknown and snow is extraordinary. 10½ hours of daylight on the shortest day of the year and 14 hours on the longest.

INDUSTRIAL SITES
The Industrial Bureau keeps a file of all available sites for industrial purposes and will assist you in securing a desired location.

according to the depth of the pile, and the cutting is by means of a knife on a carriage which runs on an accurately planed slide to and fro during weaving. When the loom is in operation, the knife touches lightly on two sharpening stones. There are two positive and continuous take-up rollers. Filling stop motions are used for either single or twin shuttles, and warp stop motions have been applied to the ground warps.

Driving is secured by a friction pulley with internal gearing on the sun and planet principle, by which the loom can be reversed slowly if necessary, avoiding the use of a second belt. When the loom is reversed all the various arrangements are reversed in harmony. These looms also may be individually driven. Fabric containing silk, cotton, wool and mohair are being woven on these looms, it is stated.

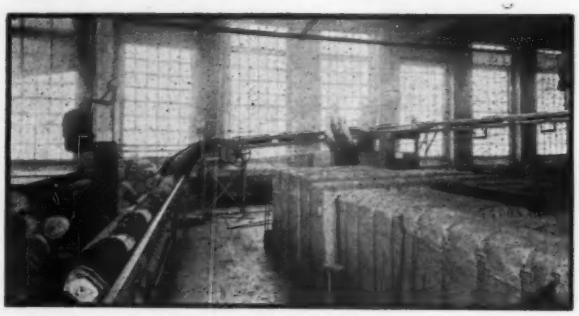
A Comment on Combing.

Editor Cotton:

I often wonder, being in the combing age here in the South, why there is not more being said about this process. Is it because we are all afraid, or is it that we do not know just what to write. I am herewith sending you a few words upon the effect of combing and trust to see much more concerning this in the future than there has been in the past. Most of us are aware that when the fibers are ripened they are twisted many times and that after passing each process their length is increased somewhat. On the other hand, if the fibers are immature, they have the appearance of a flattended ribbon when examined under a microscope and their lengths at each process are not affected owing to the absence of the convolutions.

Again, the reader should try and think what happens in the combing field during one revolution of the cylinder when the cylinder has revolved until the fluted segment is in a position to cause the detaching action. The detaching roll descends on the fluted segment forming a grip between the detaching roll and the fluted segment that grips the cotton firmly. The fluted segment and the detaching roll revolve nearer together and the fibers that are not held by the grip of the feed rolls are drawn away as the fibers are detached. The top comb is in its lowest position and the fibers that were held by the nippers are drawn through the comb by the detaching roll and segment and the dirt and short fiber, too short to be held by the segment and detaching roll are removed. The reader must understand here that particular care must be taken to have the top comb set so that it will not come in contact with the nippers or leather detaching roll. Many men advocate the use of two rows of needles on the top comb. They claim that two rows of needles give a more effective combing. This is erroneous, because the dirt and short fibers will lodge between the two rows of needles that afterward will drop back again into the web of cotton or sliver. Again, the proper angle of the top comb is not so easily obtained. besides, it is more difficult to straighten the needles if they become bent or hooked than when a single row is used. As the fibers are detached and drawn through the top comb the forward ends of the fibers receiving a combing are carried forward sufficiently to overlap the fiber ends that were returned.

It should be seen, then, that the forward rotation of the delivery roll, which occurs while the segment and detach-



Convey the Modern Way

INSTEAD of an army of truckers jostling through the aisles—the smooth, soundless flow of materials along the frictionless path of a Mathews gravity conveyer.

Instead of a fat payroll for material handling—a substantial increase on the side of manufacturing profits.

Mathews Conveyers often earn their cost within the first year, in wages saved and floor space released, to say nothing of the better coordination of production operations.

When you consider buying conveyer equipment, keep in mind that you can't buy "good" and "cheap" in conveyers any more than in other things. Although you may pay more for Mathews, you will get the utmost for your conveyer investment—in better rollers and more of them, superior bearings, stronger frames.

The Mathews District Engineer will be glad to demonstrate these facts, and tell you about the expert engineering service which insures a Mathews customer getting the right conveyer system for his individual needs.

Wire, phone the nearest Mathews Office, or use the coupon.

Mathews Conveyer Company

(Formerly Mathews Gravity Carrier Co.)

162 Tenth Street **Ellwood City, Pa.**

Canadian Factory: Port Hope, Ont.

Branch Offices in Principal Cities

MATHEWS

Conveyer Systems

ing roll grips the cotton, assists in piecing up the fibers just detached to those previously combed. In order to clearly understand what happens in combing, one must understand that at this point all fibers do not project from the feed rolls to the same extent at the one time. No matter how uniform the staple may be at this point, some of the fibers may not be held by the feed rolls at all, while others may project beyond the feed rolls a quarter of an inch, a half inch or more.

It should be seen from the foregoing that when the detaching takes place only those fibers that project beyond the feed rolls are gripped and drawn forward by the fluted segment and detaching roll, while all fibers that project only partly beyond and are still held by the feed rolls may now project entirely beyond the rolls.

It should be seen from the foregoing explanation that a wide combing field should always be the aim in the combing operation. This is accomplished by having the cushion plate held rigidly to enable the feed roll to be set very close to the nipper knife. Again, in order that the fibers may be held the proper distance from the cylinder and that the cushion plate may be set the proper distance from the steel detaching roll so as to make a good piecing, the nipper bracket should be given a horizontal and also a vertical adjustment, thus allowing the cushion plate to be set to the detaching roll which again increases the combing field.

These settings are mostly understood and can be done only by practical comber men, because it is an important setting, as it requires two adjustments that should be made at the same time, because the adjustment in one way influences the other adjustment.

Combed yarns are much stronger than carded yarns and can be detected by the naked eye because they are smoother than the carded yarns on account of the large per cent of waste which is taken out from the cotton.

Many mills run the comber waste over again, which is only carded and prepared for a coarse filling yarn.

I should be glad to hear from the readers who claim to be real good comber men. It will be beneficial to all concerned.

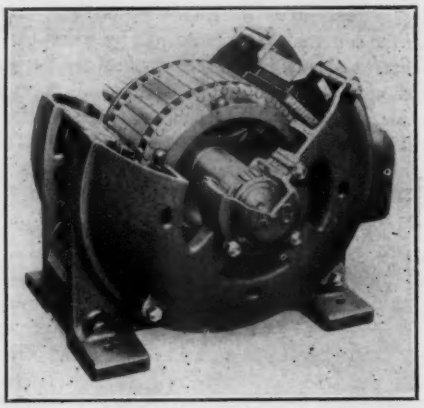
Bab (N. C.)

An Anti-Friction Bearing Induction Motor.

The Allis-Chalmers Mfg. Co., Milwaukee, Wisconsin, has placed on the market a complete line of 25- and 60-cycle squirrel-cage and slip-ring induction motors equipped with Timken tapered roller bearings. This is in addition to the company's line of sleeve bearing motors. The Timken bearing was selected only after very careful consideration of the many questions of design and operation. After designs of bearings and mountings had been made, a number of motors of various sizes were built and tested under actual operating conditions of belt, gear, chain and coupled drives a sufficient length of time to insure satisfactory service before the line of motors was offered to the trade.

The question of lubrication is greatly simplified, as grease is used requiring very infrequent attention on the part of the operator. This is an important point, because it has been found from experience that many motor troubles can be traced to improper lubrication. The bearings have grease tight enclosures effectively excluding dirt or abrasive matter that might cause undue wear. The mounting of the bearings is very simple, being only a light press fit for both the cone and cup, and not requiring the use of a lock nut or other means of holding the races in place. This also facilitates the removal of the bearings whenever necessary.

In addition to the bearings, it is pointed out, special attention has been given to many other features of design on this line of motors. The frame is made of steel with



feet cast integral to withstand shocks. The openings in the housings and frames for ventilation, are so placed in vertical planes, that falling objects cannot enter the motor. The roller bearing motor is particularly adapted to many applications because the overall length is considerably less than for a sleeve bearing machine.

Interest is being shown by cotton manufacturers in the beam dyeing equipment now being made by the Gaston County Dyeing Machine Company of Stanley, N. C. This firm has recently installed their beam dyeing equipment in the Stonecutter Mills at Spindale, N. C., and are building outfits at this time for several other mills.

It is claimed their tension controlling device for warpers has been installed in many mills using other makes of beam dyeing machinery and that several mills are equipped with their beam dryer. This latter device, it is stated, dries the yarn on the beams perfectly so that it goes to the slashers in a dry state instead of wet as has been the usual practice in mills using beam dyeing.

Among the claims made for this beam dyeing equipment are:

1. That they are able to get level and even dyeing throughout the entire mass of yarn on the beams on all classes of dyestuffs whether direct, sulphurs or vats.

2. They produce these results with a smaller percentage of dyestuff used.

Fred H. White, of Charlotte, North Carolina, is the sole selling agent for this machinery in the United States, Canada and Mexico.

H. L. Witman has become overseer of carding at the Knoxville Cotton Mills, Knoxville, Tenn.

The seventh annual outing of the employees of the Sipp Machine Company, Paterson, N. J., was held at the Regina Roost Saturday, September 12th. Athletic games and events occupied the afternoon, while dancing was enjoyed throughout the afternoon and evening.

Knitting Section

Fancy Half Hose

B-Vertical Floating Striping Machine
B-Vertical Floating Striper and Dot Machine
***B-6 Machine**
***B-7 Machine**

THESE machines offer a variety of styles and colors to meet all demands.

Simple patterns may be produced on these machines as well as the more comprehensive styles containing a multiplicity of colors, checks, dots, etc., incorporating in one machine the advantages of all these desirable features.

***Models B-6 and B-7**

These machines are built with six and seven yarn feeding fingers, respectively. These machines are of floating vertical striped design.

The vertical stripes are produced by groups of knitting needles knitting with one or two yarns used for plaiting, thus producing a perfectly clear and positive vertical stripe of a greater width than can be produced with reverse plaiting needles, particularly when using worsteds or soft yarns on coarser gauges.

The vertical stripes can be located throughout the circumference of the stocking as desired, by the use of jacks under the needles to produce the vertical stripe of the width desired.

These machines will produce repeated horizontal stripe patterns of any design up to 48 courses, if two or more course width stripes are desired. Repeated patterns up to 24 courses can be made if single course stripes are incorporated in the pattern.

The vertical striping attachment on these machines is so arranged that when making plaids or checked patterns small squares can be inserted in the middle of the check or vertical stripe.

The above machines can be set up for either men's half hose or ladies' hose, if desired.

ESTABLISHED 1865

SCOTT & WILLIAMS

INCORPORATED

366 Broadway **New York**

NEW ENGLAND SPUN COTTON YARNS

We Spin Cotton Yarns in All Numbers from 1's to 100's.

We Twist these yarns in Any Number of Plys desired from 2 ply up.

We Furnish these single or twisted yarns to suit your own particular purpose. Any Twist you say.

We furnish them on Cones, Tubes, Spools, Bobbins, Warps, Beams, Skeins—Gassed or Ungassed.

We can furnish the above from any Staple Cotton you desire.

COMBED and CARDED AMERICAN or EGYPTIAN

and behind all this an Organization that has been Spinning Yarns for Years and Years.

We recommend

QUISSETT QUALITY YARNS

SPUN FROM

EARLY BLOOM COTTON

QUISSETT MILL

NEW BEDFORD, MASSACHUSETTS

80,000 SPINDLES

QUISSETT MEANS QUALITY

Eliminating Waste in Distribution

BY CHARLES F. SCRIBNER, M. E. CONSULTING ENGINEER

MEMBER: AMERICAN SOCIETY OF MECHANICAL ENGINEERS; SOCIETY OF INDUSTRIAL ENGINEERS; THE TAYLOR SOCIETY

The topic for this year's observance of Management Week is "Waste in Distribution," and this subject should be of major interest to industrial executives, especially in the rapidly developing manufacturing centers of the South.

Some of the lessons which have been learned from applying modern management methods to a reduction of such wastes in branches of the textile industry will be of interest, not only of themselves, but from the possibility of application to other industrial enterprises.

The large returns which have resulted from time study analysis and rate setting programs in hosiery plants are partly due to the concern having orders for their product. Increasing the output is of little advantage if the product cannot be sold. Lowered cost per unit produced is a gain which may be used in either of two ways or in a combination of both. It may be used directly in the way of a larger margin of profit or in the way of a lower selling price which will bring larger profits because of increased demand.

Profits from manufacturing are dependent upon the amount of product sold and profits from selling are dependent upon economy in manufacture. To sell the product is the primary function of the sales department and to manufacture the product is the primary function of the manufacturing department. Both functions are equally important to the business for neither can exist without the other.

While their mutual dependence will be admitted it is not strange that each should think itself the most important factor in the concern's life and expect the other to realize this fact and adjust its activities to meet the situation. The firm's policy on this point is often due to the way in which a particular business has developed.

Where the financial head of the concern is head of the sales department he will naturally feel that the sales end of the business is the most important first, last and always. If he is a practical man in the industry, he is inclined to believe that the manufacturing end of the business is most important. In reality he is the co-ordinating officer who should recognize the equal importance of both and encourage them to work together for the common interest of the concern.

One may well ask: Why is there usually such strife between these two mutually concerned departments? The answer is that each is working in the dark as to what the other department is really trying to do, so that each one is ready to saddle the blame for any trouble or complaint that arises on the other department.

Need for Production Reports.

The only practical way to end this strife is for both the sales and manufacturing departments to plan action on the basis of full and complete reports of production conditions, the factory situation, and the state of the market. Under any other plan it is impossible for both of them to get together in the right spirit, discuss their differences and difficulties, and formulate policies which not only make their work easier but have for their purpose the financial welfare of the concern as a whole.

Without the aid of such reports based upon accurate data, contact usually ends in ill-feeling and hostility, with the result that each department goes its own way as before. It is, therefore, through modern management methods that this strife is prevented, because such methods have separated the facts from fiction and have brought out the essentials of the situation.

While contact serves to prevent either department being at the mercy of the other, it does not of itself co-ordinate their activities. Co-ordination of activities depends upon accurate, dependable and accessible information as to the factory situation. To understand the service to which such information must be put under modern management, the activities of the two departments must be considered from an entirely new angle.

Selling Plant Capacity.

The usual conception of the duty of the sales manager is to sell the product of the company. Viewed from another and more modern standpoint his duties are not so simple. In selling the product he is really selling the plant capacity for making the product.

What is meant by selling plant capacity may be expressed as follows: At times the entire output of many plants is spoken for months in advance and salesmen cannot continue to sell because the plant capacity has been used up. This may be due to lack of equipment, lack of material, or lack of labor—all three factors of which limit plant capacity.

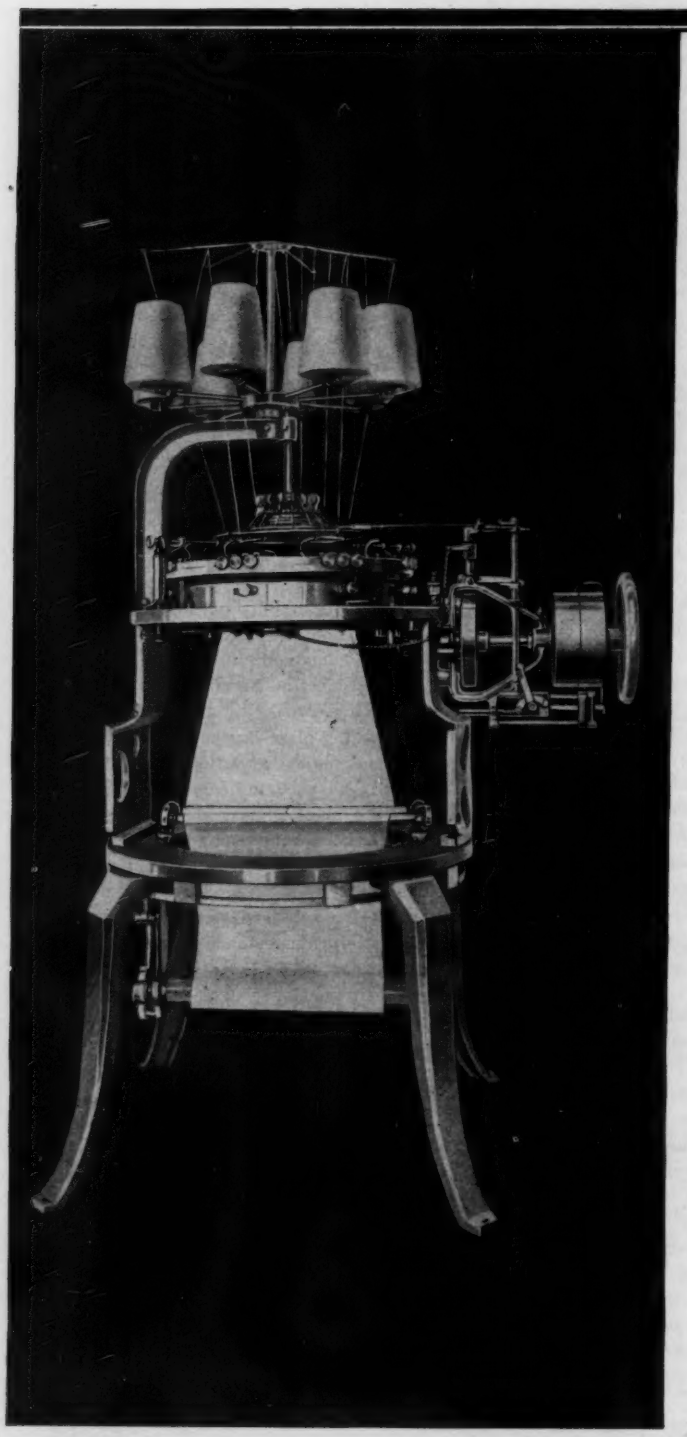
During such times the salesmen—and sales managers also—first realize that by selling standard lines for which material is on hand or on which labor is less, instead of pushing the more easily sold specialties—in other words, by paying attention to manufacturing needs—they can in a real sense actually increase the plant capacity.

It is further proved that any unsold capacity or idle equipment is a drag on the rest of the plant. The total factory expense cannot be distributed over as many units of product, hence the cost per unit turned out rises. In a competitive market, where prices are usually fixed, loss is sure to follow unsold plant capacity. Thus it may be best to sell some line at what appears to be a loss in order to avoid the greater loss from unsold capacity to produce. It does not follow that when the largest volume of product is sold that manufacturing costs are lowest and profits greatest, rather it is true that when the entire plant capacity is sold, then profits are the largest.

Reports on Plant Capacity.

Looking at selling and manufacturing from this viewpoint it is seen that the reports on which plans are based should show the available plant capacity for each line of product turned out. Such a report covers each operation or process separately and gives a statement of the amount and type of work that is ahead of each class of machine or production center.

These reports are based upon two elements of modern management—operation analysis and production control. The information which they furnish is collected and filed



Made to Meet Your Requirements

The Wildman Spring Needle Body Machine has been developed to meet the exacting requirements of the trade. In the hardened steel needle cylinder on the Wildman, the cuts are accurate to 1/1000 of an inch—a guarantee of faultless fabric.

Changes of stitch are controlled by graduated micrometer adjusting screws which *stay* set. The new style ball-bearing take-up keeps the cloth under absolutely uniform tension.

Even yarn breakage is eliminated as far as is mechanically possible by the addition of the Wildman Furnishing Wheel Unit—supplied only with this machine. Illustrated instruction book furnished without charge.

We have issued a new edition of the complete and informative book, "The Science of Knitting." Price $2.00.

WILDMAN MFG. CO.
NORRISTOWN, PA.

and is a result of standards set by time study analysis of operations. Applying this information in the factory at any given time is a part of the process of production control. Material from which the reports are condensed is constantly used in the detailed planning and scheduling of work in the production control department. No extra work of consequence is required to prepare and present this information to the sales manager.

When an order is received the production control department breaks it up into jobs that can be handled conveniently, then analyzes these into the operations or processes through which each job is to pass. Each one of the operations is recorded on a separate card. The standard time required to perform each operation has previously been determined, as well as the efficiency of the factory in each of the several departments and at the various machines or processes.

From standard time charts and the current performance charts the production control department is able to record on each operation card not only the time that the job is to be started at the first operation, but also the time it can reasonably be expected to pass that stage ready for the next operation. The variable factors of the order are also recorded on the card.

A visible index file is kept of all jobs or orders planned for each operation, classified according to the special type of machine or the labor necessary for the job. This file shows the production control department which machines or production centers are to be free at a specified date. With this information before him the production control superintendent can schedule the work to a machine which it requires and which is available to do the work. If equipment of any type or any process is over or underloaded the visible index, with its cards for each job, will show this condition at once.

Method of Making Reports.

Weekly the head of the production control department goes over the visible index and takes off a summary of the condition of work as regards the various operations and processes, the dates on which machines of different types will be out of work, and the total hours of work ahead of each machine or process. He also notes the class of work on which each machine is occupied, as this shows the sales department that orders for the same class can be put through the plant more easily.

The sales manager and the factory manager in conference then go over this summary of the available plant capacity so they may utilize and sell the plant capacity to the best advantage.

Strengthening Sales Service.

The service which the sales department gives to its customers is strengthened by the resulting co-ordination of activities. The sales manager can make definite promises to his customers because he has definite production information and he can reasonably count upon keeping his promises.

Good service on deliveries is extremely important. Although a plant may have the best quality of product to sell and the best sales force to sell it, failure to make promised deliveries means cancellations, loss of future sales and loss of profits. Giving this service depends upon receiving accurate information as to shipping dates and such information is secured as a result of detailed planning. The value to the customer in having a delivery date upon which he can absolutely depend cannot be overestimated.

When delays are unavoidable the sales manager is notified and he is also informed of the cause, as well as given another date when shipment will be made, so he can satisfy the customer. By so doing he is relieved of having to explain to customers the reason for the non-appearance of their goods according to promise made and their good-will is retained for future business. It makes a difference whether the customer is advised several days in advance that his shipment will be somewhat delayed, or whether he has to write and find out why shipment was not made according to the promise given him.

Treatment of preferred orders resulting from joint conference on the manufacturing situation is of great value to the sales manager. To put through every other order as a "rush," "special," or "rush-rush" order means broken promises, internal friction and dissatisfied customers. Without definite figures it is not easy to convice the sales manager that any order to which he wishes to give preference must not displace work already planned and scheduled. The reports show how the work is planned and when a request is made to give new work preference the factory manager can point out to the sales manager just what is displaced and what extra cost will be incurred. Then the sales manager can decide knowingly which job is the most important.

A reputation for uniformly prompt delivery dates, regularly lived up to, is a much better selling argument than promises of special favors which cannot be kept.

Economy in Manufacturing.

This plan of rushing orders only after considering their need gives great relief to the manufacturing departments. Without such a plan the factory is constantly required to make changes in plans, speed up the employees, and even take half-finished goods out of process in order to make way for the preferred order. While it is the duty of the factory to use to the fullest extent the potential plant capacity, this can only be done by having the cooperation of the sales department.

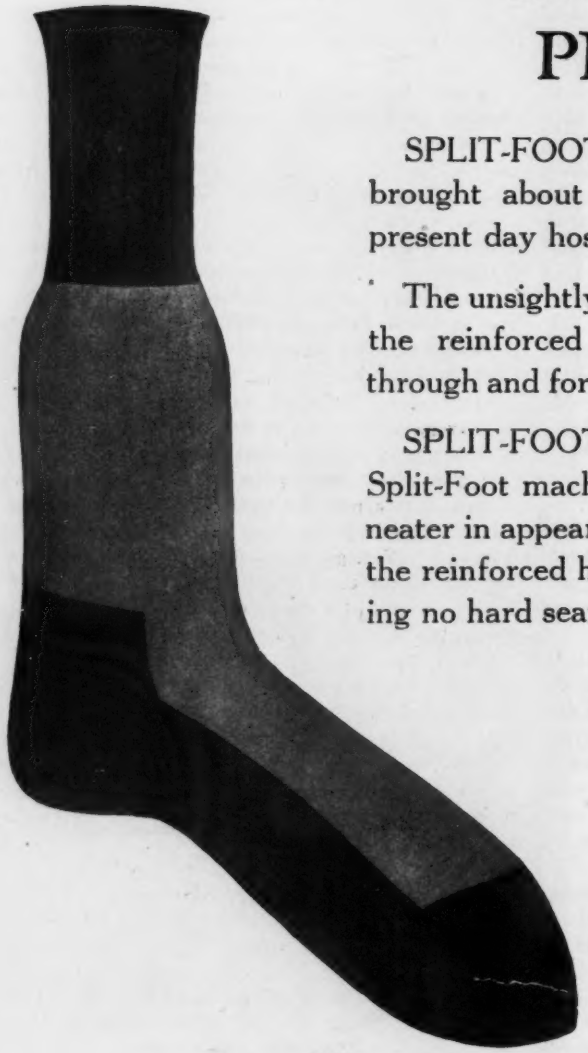
With an organized plan the manufacturing department is able to handle orders more quickly. First, all orders are reported to the production control department as soon as they are received, with a desired date for their delivery. Neglect on the part of the sales department to specify the desired delivery date will always lead to misunderstandings. With standardized methods the plans of the factory manager are not subject to many elaborate adjustments if there is a conference on suggested changes with the sales manager. At the time the report of factory conditions is at hand and the expense involved in suggested changes is made clear. With a knowledge of when machines will be idle the factory manager can often request certain orders from the sales department that will keep this equipment in operation.

Estimating Order Costs.

Information compiled through operation analysis can be used to balance the activities of the manufacturing and sales departments in the calculating of estimated order costs. Figures used to determine standards which employees actually accomplish day after day are put in tabulated form for estimating purposes. Where this is done at the suggestion of the sales manager it serves as the first step in interesting the sales department in the work done in the manufacturing department. The sales manager sees the value of changing some of his methods of cost estimating which have been in use for years and which are not as flexible or accurate as the new methods. Two great advantages

The "BANNER"

SPLIT-FOOT PRODUCT



SPLIT-FOOT HOSIERY, the new creation, brought about by the main disadvantage in present day hosiery, namely:

The unsightly inside fringe of splicing ends in the reinforced portion which tends to slip through and form whiskers on the outside.

SPLIT-FOOT hosiery made on "BANNER" Split-Foot machines is smoother on the inside, neater in appearance and has added strength at the reinforced high splice and double sole, having no hard seams.

WHY MAKE AN INFERIOR PRODUCT?

WE INVITE INQUIRIES

HEMPHILL COMPANY

Main Office and Factory

PAWTUCKET, RHODE ISLAND

New York Sales and Show Rooms
350 Broadway, N. Y.

Southern Office,
James Bldg., Chattanooga, Tenn.

Philadelphia Sales and Show Rooms
Colonial Trust Bldg., 13th and Market Sts.

come from figuring estimates on the basis of data furnished by the manufacturing department and which has been determined by operation analysis.

Figures based on operation analysis are dependable and accurate. Those upon which sales estimates are usually based have been reached by someone making a good guess as to an average in times past. The method usually followed is to take all machines as well as all jobs of a certain type and bring them together under a single classification, regardless of the variations in the character of the work. Then an estimate is arrived at which is used for all jobs of this class. As a result a large margin of profit has to be allowed over and above this indefinite figure, when, with accurate figures based on careful study and showing actual cost of variation in orders it is possible for the sales manager to make much closer estimates, often underbidding his competitors for much desirable business.

Another advantage is that if the estimates are figured on manufacturing performance a close check is secured between actual and estimated costs. It is then easy to find where and why orders are being taken at a loss and to avoid a repetition of the mistake.

Determining Company Policies.

The reports furnished by the manufacturing department to the sales department are not only valuable in making detailed plans from day to day and from week to week, but in determining the broad policies of the concern. The sales and factory manager can work out plans suited to their mutual needs, which are submitted to the general manager for approval. These include decisions as to maximum and minimum quantities of stock to be kept on hand at different periods, what special lines to push, advisability of standardizing the product to reduce costly variations in style, and the development of new lines of products.

Under these plans there are no longer two opposing viewpoints, one of the manufacturing departments making what the sales department can sell and the other of the sales department selling what the manufacturing department can make. Instead, the two departments are co-ordinated because of the company policy which is designed to help the manufacturing department utilize the full plant capacity, with the single aim of the greatest economy, the minimum waste in distribution and the largest profits to the business as a whole.

Among the Knitting Mills.

Additional full-fashioned machines will be installed soon by the Triumph Hosiery Mills, Philadelphia, Pa., bringing the equipment up to six units of three leggers and one footer each. The company has doubled its floor space in preparation for the new installation.

The William Brown Co., Philadelphia, Pa., manufacturers of Granite brand silk hosiery for women, is making the second installation of full-fashioned equipment within a year.

An addition will be built to the warehouse of the P. H. Hanes Knitting Co., Winston-Salem, N. C. J. E. Sirrine & Co., Greenville, S. C., are the engineers.

The Apex Hosiery Co., Philadelphia Pa. full-fashioned hosiery manufacturers have awarded a contract for the erection of a mill building addition, 95x154 feet, six stories high, with basement, at Fifth and Luzerne Streets.

Mountain City Knitting Mills, Chattanooga, Tenn., will build a new mill structure, 60x80 feet, two stories with basement.

Rosedale Knitting Co., Reading, Pa., are making extensive improvements. Two floors, occupying a building 100x250 feet, have been added to the manufacturing plant, and another building, 200x300 feet, two stories, will be built, and 160 imported knitting machines are being installed.

Charles H. Bacon Co., Lenoir City, Tenn., will, it is reported, build a mill at East Chattanooga, Tenn. T. J. Campbell, at one time connected with the Richmond Hosiery Mills, Rossville, Ga., will be general manager of the new mill, it is understood.

James R. Kendrick Co., Inc., Philadelphia, Pa., will erect a five-story addition, 45x70 feet. This concern manufactures elastic hosiery.

Sunset Silk Hosiery Mills, Los Angeles, California, will erect a new mill, 70x135 feet, it is reported.

The Busy Bee Hosiery Co., Northmont, near Reading, Pa., plan the erection of an addition to their plant, it is understood.

Meinig Hosiery Co., Reading, Pa., will soon erect an addition to their plant at 2047 Kutztown Road.

Liberty Hosiery Mills, Burlington, N. C., will erect a knitting plant with a daily capacity of 300 dozen hose. The building will be 30x50 feet. Charles F. Foster is secretary.

The publishers of Davison's Textile Blue Book, announce the completion of the 38th annual edition, July, 1925, which shows every mill report carefully revised. 781 new manufacturers have been added, while all mills out of business have been taken out.

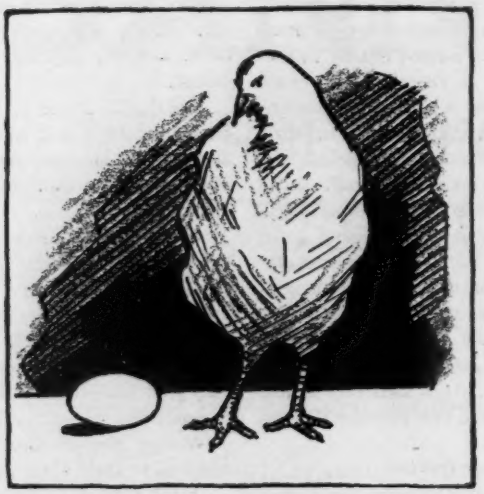
The Textile Blue Book is really 21 directories in one volume, as follows: Directory of cotton mills; woolen mills; worsted mills; silk mills; knitting mills; jute, linen and flax mills; Canadian mills; Mexican mills; dyers and finishers; mills with dye houses; textile mill security brokers and dealers; commission merchants; cotton dealers (both domestic and foreign); wool dealers; linter dealers; waste dealers and manufacturers (both domestic and foreign); wholesale rag and remnant dealers; textile supplies; new textile mills; classified directory of mills.

Two editions are issued: the office size, 1,900 pages, with heavy cloth binding, contains all the above features, while the "Handy Edition," 1,800 pages, has all information given in the office size, except the classified directory of mills and textile buyers' guide.

The Salesmen's Directory, bound in flexible covers, size 3½ x 5¾ x ½ inch thick, is much smaller than the handy edition.

The volumes can be obtained from the publishers, Davison Publishing Co., 50 Union Square, New York. Prices delivered, office edition, $7.50; handy edition, $5.00; salesmen's directory, $4.00.

A new edition of the Westinghouse catalog of electrical supplies has just been issued by the Westinghouse Electric & Manufacturing Company. It presents an almost complete listing of apparatus manufactured by this company. The catalog contains 1182 pages, and replaces all catalogs heretofore issued on electrical supplies by this company. It is issued for the period 1925-1927.



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A Reason for Corner Hole Cutting.

Editor Cotton:

The several answers you have published to my original question about George D. Mayo machines cutting corner holes are very much appreciated. However, I had tried about everything suggested with little relief. This is perhaps due to the fact that we make what is called a prominent heel and toe, with heavy splicing in the heel and toe. In such a case the cylinder has to fall so far that it causes a kink in the yarn, making it jump over the head of the needle.

Perhaps I should have given this explanation when I first asked the question. If anyone can make any further suggestions with this additional information in hand, I shall appreciate it. All of the suggestions that have been made are good when applied to regular work, but the condition just described requires something more.

F. G. H. (N. C.)

Using and Adjusting a Model K Machine.

Editor Cotton:

The previous article on the Model K Scott & Williams knitting machine dealt with problems arising in the fitting of new parts in the machines, etc. The present article will consider in detail various difficulties which commonly arise in the operation of the machines, and how to remedy them, such as broken needles, threads pulling out of the machines, machine becoming stuck, etc. It will also take up such points as sizing the work, yarn tensions, importance of needles, fashion marks, etc.

Needles Breaking Almost Anywhere.

If the needle does not have enough friction, it will bound up and hit on the points of the switch cam and the center cam. The obvious remedy is to have the proper amount of friction on the needles. The cylinder spring band being too weak will not put the proper amount of friction on the needles, resulting in the difficulty just mentioned; to remedy this a new band should be put on.

The butts of the needles scraping between the left-hand side cam and the stitch cam will cause trouble, and to eliminate this, the side cam should be set out just enough to allow the needles to pass freely.

If the right-hand stitch cam raises the butts of the needles too high, they will come in contact with the right point of the center cam, breaking them off. The remedy is to grind the point on the center cam so that the needles will clear; this is done by making the right point higher. Care must be taken, however, not to get this point too high, for the up-picks will not raise the needles high enough to clear.

We invite our readers to make use of this department for the discussion of any and all problems arising in connection with the knitting mill from the office to the packing and shipping departments. Questions, answers or letters need not conform to any particular style and will be properly edited before publishing. All questions will be answered as promptly as possible. The names and addresses of the contributors must be given, but will be held in confidence and a pen name substituted when printed. All accepted contributions other than questions will be paid for after publication. The editors do not hold themselves responsible for any statements of opinion or fact which may appear in this department unless so endorsed. This department is open to all.

Needle Importance.

Too much stress cannot be put on the importance of keeping the needles in good condition. The machine is dependent upon the needles for forming a stitch, and as the needle sets in the machine, so the stitch is going to be formed.

The first main requirement is to keep the needles in perfect alignment. This is necessary not only when the needles are down, but also when they are on the heel and toe. Practically every part of the stocking is dependent upon the needles being straight. If they are out of line, every kind of imperfection is bound to be made from time to time.

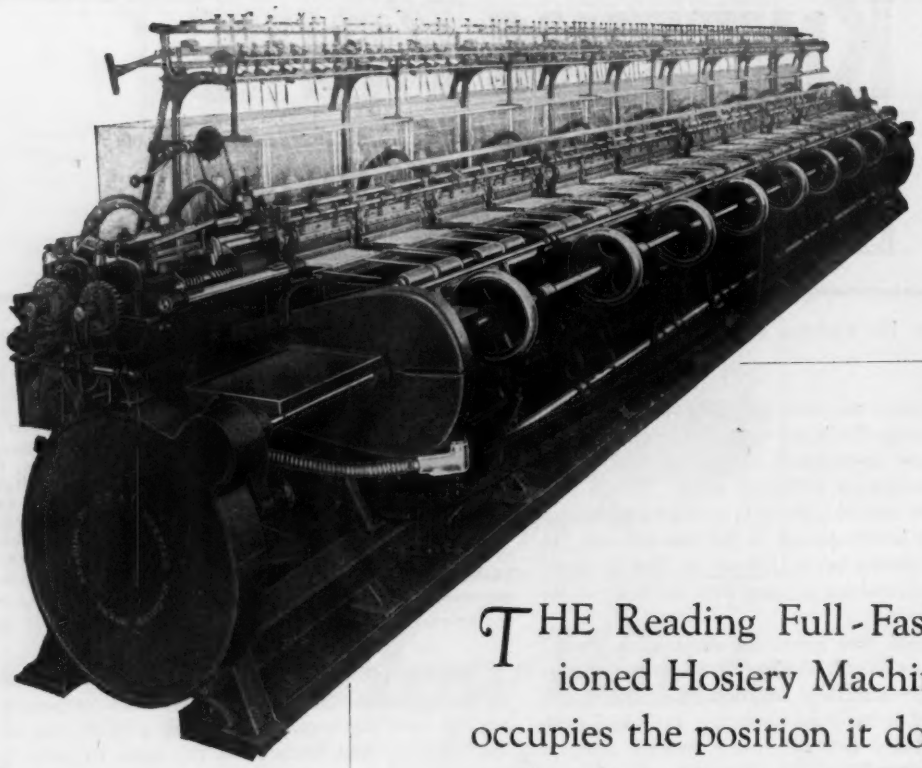
Next comes the necessity for keeping the proper amount of friction on the needles. Too much friction is just as bad as not enough, and vice versa. When the needles come from the factory, they have a slight bend, but this is not enough for the right friction. If the needles do not have enough friction they will bound down too easily, causing drop stitches and breaking needles. If they have too much friction, they will break needles when going through the set up, also on the heel and toe. The splicing will be thrown over also. There should be enough friction on the needles so that they will go up and down fairly medium. This is secured by putting a little more bend on the needle than is already on it. A loose needle will drop down in the slot almost of its own weight. A tight needle must be forced down with pressure.

Machine Becoming Stuck.

Sometimes the butts of a few sinkers will break, the butts becoming caught in the sinker cap, resulting in the machine sticking. The cap should be taken off, the broken butts removed, and new sinkers put in.

The screws in the splicing cam around the cylinder becoming loose will result in their getting caught on the clamps holding the sinker cap, causing it to stick. The screws should be kept tightened.

When the machine is going through the yarn changes, and if the butts of the needles break they will sometimes



THE Reading Full-Fashioned Hosiery Machine occupies the position it does today because manufacturers of ladies', fine full-fashioned, silk stockings have found it thoroughly tested and perfect in performance.

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get caught under the left-hand stitch cam due to the narrow passage between the stitch cam and side cam. The stitch cam should be taken off to allow the broken needles to pass that point.

When the machine turns hard when on the heel and toe this is generally due to needle butts being under the cylinder. The remedy is to loosen up the three screws holding the main plate. This will generally loosen up the machine. If this does not help it, the only thing to do is to take the machine apart.

When in doubt whether the machine is stuck in the cylinder or other parts of the machine, put a screw driver under the cylinder tube, raising the cylinder up and down. If the cylinder moves freely the machine is stuck in some other part of the machine.

If the heel and toe handle can be turned half way around, but sticks there, the trouble probably is due to the switch cam rod not dropping quick enough. The two rows holding the clutch key 7000, which will be in the back of the machine, should be taken out, and the clutch key knocked out with a screw driver, holding up the change pawl and setting the machine over until it changes on the straight course. Then the cylinder should be turned around until the groove that the clutch key goes into is in front, and then the clutch key is put back in.

When the machine is taken apart, the cam ring has four screws which hold it to the bed plate 5553. The screw on the right side of the machine is shorter than the other three. This is necessary in order to have it clear the bevel gear. When putting the machine together, if a long screw is put in this screw hole instead of a short one, it will lock the machine.

Putting Machine Together Correctly.

When putting a machine together, every part of the machine should be looked over to make certain there are no needle butts lying around, especially under the main plate. If a machine is put together and there are still some needle butts under the cylinder, the machine will stick, resulting in having to take the machine apart again.

There will be trouble on practically every part of the machine if there are any needle butts under it, which will be confusing until the needle butts are removed. If there are any needle butts under the latch ring bracket 6113, this will throw the jack dial off center, resulting in a jack smash-up. If, after the machine is put together, and the jack dial is off, look for needle butts under this bracket.

If any needle butts are under the auxiliary cam bracket 5474, trouble will result in needles breaking off on the point of the right-hand stitch cam.

When putting the machine together, every screw should be tightened as tight as possible to prevent any working loose.

Centering Up a Dial.

If the jack dial cannot be gotten in line with the cylinder needles, centering up of the jack dial is necessary. The following is the procedure: Take off the dial, dial levers, dial plate, and remove the gear cover from the dial gears; mark the gears so that they can be meshed back again in exactly the same place; then pull out the dial shaft and remove the gear that the shaft goes through. Put the machine on the heel or toe, raising all of the short butt needles level with the long butts. Put in the centering dial for the purpose with the hub pointed down into the cylinder. Take out the two pins holding the cross bar 5557. Loosen up the screws holding the cross bar 5557. Put the cover down and adjust the shaft hole in the cross bar 5557 so that it is in a perfect line with the hole in the centering dial. Then tighten the screws that hold the cross bar 5557, being careful not to get it out of line with the centering dial while doing this. Ream out the pin holes, putting in larger pins. Put back together.

Sizing Up Work.

One problem is in the stocking running too long. One of the most common causes of this is the yarn being out of the yarn tension. Before making any adjustments this point should be checked.

If the left-side cam is too far away from the stitch cam, the whole stocking will be too long. This side cam gets out of adjustment by the butts of the needles breaking off and the machine sticking. This results in the stitches not being cast off the hooks of the needles quickly enough, lengthening out the stitch. The side cam should be pushed toward the stitch cam as far as it will go, then back out until the needles pass freely without binding.

If the graduating attachment is out of time, it will cause a long boot in the stocking.

If the inside of the cylinder does not get enough oil from time to time it becomes dry, resulting in the cylinder not dropping low enough in the various parts of the stocking. Raise the cylinder up and down with a screw driver from the bottom of the cylinder tube to see if it works freely. If not, the inside of the cylinder should be oiled. Also if the machine has quite a few needles with too much friction on them this same thing will result.

The yarn running light and heavy changes the length of the stocking, and, of course, the remedy is to get even yarn.

When the machines are started the first thing in the morning, the stockings all run tight because the yarn is damp from standing overnight, and because the machines are cold. No adjustment should be made on any machine the very first thing in the morning, unless some of the stockings are *very* short. When the machines run for a half-hour they become warmed up and run down to length. If any changes were made the first thing in the morning, when the machines were cold, the same machine would have to be re-adjusted when it warmed up.

Putting a new set of needles in a machine has a tendency not to let the cylinder drop as far as it should, due to the fact that the needles work a little too stiffly in the cylinder, which results in the stocking running too long. The remedy is to let the machine run with the top up for a little while until the needles get worked in more, and also oil properly. Taking a cylinder out and putting it back in sometimes causes this trouble.

Fashion Marks.

If the fashion marks are dim on one side only, this trouble can be generally overcome by bending the latch of the fashion needle out slightly. However, this should be done only as a last resort.

If the fashion marks are dim on both sides, the trouble is generally due to the stitch being too tight. If the foot will not stand loosening, then the trouble is with the right-hand sitch cam not getting a full throw when on the fashion marks. The stitch cam might be sticking, thus not dropping quick enough. The foot should be loosened up a little.

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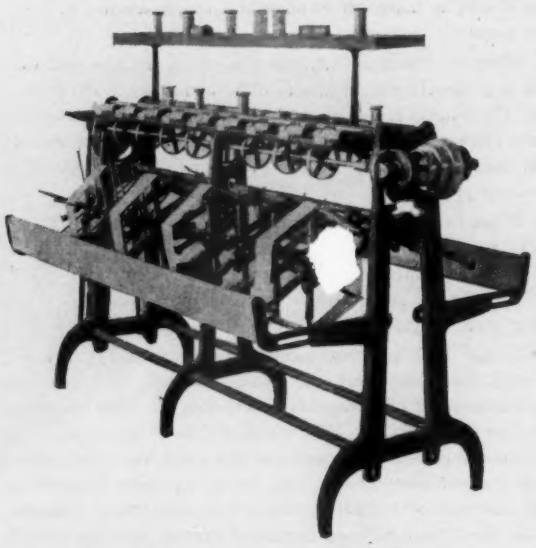

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The following point is important in connection with fashion marks: Take the machine through by hand when on the fashion marks. As the cam drops, all of the points shown as *A* and *B* in the accompanying illustration, Fig. 2, should be the same height. If point *A* is higher than point *B*, grind a little off of *A*. If point *B* is higher than *A*, take a little off of *B*. Before grinding any off of *A* it must be taken into consideration that the right-hand up-pick has to fit in the slot in the stitch cam, so if too much

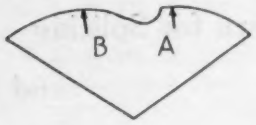

FIG. 2

is taken off, the picker must be adjusted to fit into the slot of the cam. Before grinding any off of *B* care should be taken that when the cam drops that it is not hitting on top of the lower center cam, thus not letting it get a full throw. If this is all right, then take a little off of *B*, but take into consideration that *B* must bring the needles high enough when going through the hem to clear the latches of the fashion needles, otherwise fashion marks will result at the hem transfer. Understand this clearly.

If fashion marks are left out in various places, the trouble is due to the fashion mark catch 5363 not snapping back into position, after it has made its upward stroke. Then, when making the next throw the fashion catch not being under the fashion mark link 9090 it does not get a full throw, resulting in the fashion marks being left out. To remedy this, readjust the fashion mark link upward so that it just snaps back under the fashion mark catch 5363. The fashion mark catch might be binding.

Threads Pulling Out of Machine.

The yarn clamp not keeping enough friction on the thread as the machine goes through the various changes is one of the chief causes of the thread pulling out of the machine. As the thread is making a yarn change, if there is not enough friction, it bulges out and does not get caught on the needles. The remedy is to take the yarn clamp out and give it a little more bend so there will be more friction on the thread when going through the changes. Too tight a yarn tension, a nick worn in the throat of a sinker, a sharp burr on the bottom of the finger eye, thread caught on the bottom of the cone or somewhere on the machine are other common causes. The remedy in each case is evident.

Yarn Tensions.

The splicing thread should have no tension on it. This thread, being so fine, will break or pull out of the machine at the slightest strain. If tension is put on, the plaiting will be thrown off in the foot, which spoils the appearance of the stocking.

Tension on mercerized yarn, in the majority of cases, is not needed. Most mercerized threads run evenly, and do not have any twist to them. If the mercerized thread is run in the boot part of the stocking, it is sometimes necessary on certain machines to put on a little tension in order to get even plaiting.

Pure silk should always be run under tension in order to get an even stitch. There should be just enough tension so that the thread pulls fairly easy between the two discs. Care should be taken not to get too much tension on silk because trouble will result in threads cutting off or pulling out of the machine.

Artificial silk should have just enough tension so that the thread pulls fairly easy between the two discs. This is necessary because the artificial silk has more of a twist than pure silk.

Note: All silk, artificial silk and chiffon should have tension, in order to get a tight, even stitch which makes the appearance of a silk stocking good. Too much tension should not be put on as trouble will result in the thread pulling out or cutting off in the machine.

Cotton yarn should have no tension. This thread is not very strong and the slightest pull on the thread results in the thread pulling out of the machine. It is sometimes necessary on certain machines, where cotton is used for the boot part of the stocking, to have a little tension in order to get the plaiting even, owing to the twist in the cotton thread.

Slack Course.

The slack course should be made as plain as possible. If made too big the strain on the thread will be too great, causing cutting out in various parts of the looper line. If the machine keeps cutting out, the following should be checked over: Bad needles, broken sinker, left-hand sinker cam not set right, left-hand stitch cam not concaved right. These are the only things that can cause cutting out on the looper line.

The remedy for the bad needle and broken sinker is obvious. As to an improperly set left-hand sinker cam, the sinker cams want to be set so that the back of the needles is even with the throat of the sinker as the needle rises. The throw of the sinker cap, which is secured by means of the set screws on the sinker cap, should be in as far as possible without having the sinkers project into the needles where the stitch is being formed. Extreme care must be taken when making the adjustment for the throw of the sinker cap. When making the adjustment on the left side sinker cam, it must be taken into consideration that the slackening cam goes in ⅛-inch when on splicing, which brings the sinkers in so much quicker, so if the cap is set in too far the sinkers will project into the needles, where the stitch is being formed, causing cutting out.

In case the left-hand stitch cam, if found to be improperly concaved, the method to pursue is as follows: The left-hand stitch cam is concaved only on the side shown in the illustration, and the concave should not be more than ¼-inch long. If more than this is taken off, the needles

FIG. 3

will ride too high, allowing the thread to get pinched, causing cutting out. When concaving the cam not more than 1/16-inch should be taken off, otherwise there will be too much vibration in the needles. See Fig. 3.

If the looper line is not all the way around, the trouble is due to one of two things. The looper drum cam may be too short, causing the control lever for the looper line to drop off of the cam before the machine makes a full revo-

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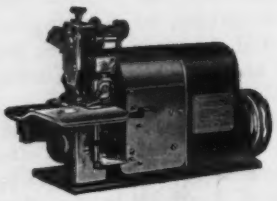

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lution. The remedy for this, of course, is a new cam. Care must be taken when putting it on, however, not to get it too long, as the control lever will not drop off of the cam after the looper line is completed, causing too loose a trimming on the stocking.

Or the looper cam may be higher on one end than the other, which would make a tight stitch on the low side and a long stitch on the high side, giving the appearance of the looper line not being all the way around. The remedy in this case would be to level out the cam, either by the adjusting screws on the cam, or by putting a piece of paper under the low side.

If the looper line is too dim, this trouble can be easily overcome by raising the looper slack course cam higher, according to how much more is needed. Several things must be taken into consideration in doing this. Raising the looper cam higher means that the cylinder is going to be raised higher when going through this change. The brush bracket fits very closely to the cylinder sinker cap, and if the cylinder raises too high, the sinker cap will hit the brush bracket, throwing the brush adjustment off, which will cause considerable trouble in various parts of the stocking. This trouble can easily be overcome by filing some off of the bottom of the brush bracket so that it clears when going through the looper line change.

Large Cut-Outs in Heel and Toe.

If a large cut-out appears in the heel and toe, one of the first things to look for is whether the heel and toe thread is caught somewhere on the machine. When a cone of yarn gets about one inch from the bottom of the cone the thread is more or less lapped over on the bottom of the cone, which will cause a jerky motion of the thread and will cause a cut-out. The thread not being properly threaded will cause this also. The remedy, of course, is to change the yarn if it is lapped over very bad.

A short butt needle bent out of line when on the heel and toe will cause a large cut-out.

The tension on the heel and toe yarn, if it is not tight enough, will cause a cut-out. But it should not be too tight. There should be enough tension on the heel and toe yarn, so that when the yarn is being released the tension will hold the yarn from coming out any more, until it is pulled in again.

A sharp corner on the bottom of the heel and toe finger will cause a cut-out as the thread is being released when making the reciprocating motion, it will get caught on the sharp corner of the finger, not getting a full throw. The corner should be smoothed off.

If the back end of the yarn take-up, when moving up and down, hits on the take-up lever yoke stud 6902, the yarn take-up will not get its full throw, thus kinking the yarn, and resulting in a large cut-out. This is one of the more frequent causes of large cut-outs on the heel and toe. The yarn take-up should be set so that there is ¼-inch space between the take-up yoke stud and the set screw on the take-up lever yoke spring arm 6901, when off the heel and toe. If set up any further than this, the heel and toe yarn will be pulled out from the clamp when going through the other changes.

Another frequent cause of cutting out is the stitch cams, both left and right hand, being ground too steep on the side of the cam indicated by the arrows in the accompanying sketch, Fig. 4. A stitch cam should never be ground on this side of the cam, under any circumstances, as no advantage is gained, and it only spoils the cam, which costs $1.10. The needles will bound away too quickly, resulting in a cut-out. If the cams have been ground on this side they should be changed.

If the throat plate is too far away from the needles, cut-outs will occur. There is a lot of wear on the throat plates and they must be set ahead if back too far. When making the reciprocating motion, if the throat plate is back too far the thread will miss some of the hooks of the needles, especially if they are not straight, resulting in the thread being thrown out. An adjustable throat plate should be used.

Setting Sinker Cams.

The sinker cams should be set in so that the backs of the needles will be even with the throat of the sinker as the needle arises. This is of importance and is one of the main causes of cutting out in the heel and toe. The throw of the sinker cap which is gotten by the set screws on the sinker cap, should be in as far as possible without having the sinkers project into the needle path, where the stitch is being formed.

Extreme care must be used when making the adjustment for the throw of the sinker cap. When making the adjustment on the throw of the left side sinker cam, it must be taken into consideration that the slackening cam goes in

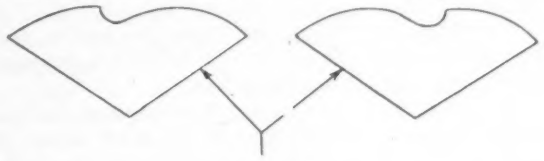


FIG. 4

⅛-inch when on splicing, which brings the sinker in so much quicker, so if the cap is set in too far, the sinkers will project into the needle path where the stitch is being formed, causing a cut-out.

Breakage of Transfer Jacks.

If the two set screws on the shaft gears do not mesh and the high butt dial jacks are not in front of the operator when starting the machine, breakage of jacks and needles will result. The reason for this is that the two set screws when meshed with the high butt dial jacks in front of the operator times the throw of the jacks in relation to the throw of the cylinder needles when making the set-up. If the set screws are off one or more the dial jacks are out of time, resulting in the jacks coming out too soon or not soon enough, which causes broken jacks. The remedy of course, is to set the dial correctly.

A cylinder needle or dial jack that is out of line will result in broken jacks. They should be kept straight.

The general cause of broken jacks is due to the dial being out of line in relation to the cylinder needles. As the dial jacks are coming out, instead of going between every other needle, some will hit the cylinder needles due to the fact that they are set too far ahead or not far enough as it happens to be. The dial should be lined up. Instructions for doing this may be found in a previous paragraph in this article, headed, "Centering Up a Dial."

If the set-up cams become loose, broken jacks will result. This will result in the dial levers not getting a full throw. The set-up cams on the drum should be checked over, also the cylinder set-up cams, and tightened if found to be loose.

Shears Not Cutting at Yarn Changes.

If the shears cut off before the thread gets under them the trouble is generally due to the shear drum cam being too short. A burr on the dial plate will hold the thread back long enough to prevent the thread from getting under the shears. Burrs should be kept smoothed off, and a longer drum cam used.

If the shears do not cut off, and remain raised, the trouble is due to the shear drum cam being too long, and a little should be taken off of it.

If the shears do not cut quick enough or too quick on two or more changes, the trouble is due to the drum being set too far or not far enough ahead. This adjustment can be made by the drum driving gear 5479, by either setting the drum ahead or setting it back, as the case may require. Before changing this adjustment, drive a block under the back wheel 5540 to hold the main shaft from moving. Care must be taken not to change the adjustment any more than is needed, otherwise trouble will result as the machine is going through the other changes.

The next letter will discuss more common difficulties and their remedy. RYMI.

Degumming Silk Hose.

EDITOR COTTON:

Contributor No. 1425 in your September number who is having difficulty with his silk hose being stiff, is going at this proposition in the wrong way.

In the first place, he is wasting time and money by trying to boil out the stockings with 20 per cent of monopole soap and 2 per cent of calcined soda after they are dyed. For one thing, the soda is the worst thing he could put on silk. The next thing is the fact that monopole soap is too expensive for this purpose. Last, and the greatest error of all, is the fact that he boils off *after* the goods are dyed.

All the boiling off should be done before the dyeing. I am not surprised in the least that the goods are stiff, as the calcined soda will do this very thing. Neither would I recommend monopole soap for this purpose, as monopole soap is simply a saponified sulphonated oil. My advice to him would be to use a regular boil off oil before dyeing, such as Hydroxy boil off oil. If the goods are all silk, he could use anywhere from 8 to 12 per cent of oil, cutting down the quantity if there is any cotton in the stockings. The boil off oil is first put in the bath and then the stockings, and the stockings run to a boil and worked for about an hour. They should be thoroughly washed before dyeing if he wants a soft stocking.

After dyeing and rinsing he should add a small amount, say 1 or 2 per cent of something like Solivol (this is an emulsion olive oil) and leave it in the goods and he will get a soft stocking and one that I believe will be entirely satisfactory. A. N. E. (PA.)

Eliminating Oil Streaks in Knitting.

EDITOR COTTON:

Answering Contributor No. 1425 in the September number in regard to black oil streaks in the transfer and on the heel and toe. This trouble is due to using improper oil for lubrication purposes. For lubricating the transfer bits, sinkers and cylinder needles it is always best to use a stainless oil. For a number of years the writer has used a stainless oil for this purpose obtained from the Cities Service Oil Co., Philadelphia, Pa. The trade name of this oil is "Stainless Drip Toe Oil."

The use of a stainless oil of this type always eliminates any difficulty that may otherwise arise in attempting to dye the work in light shades. RYMI.

Do Men or Women Make the Best Knitters.

EDITOR COTTON:

In answer to the much mooted question as to whether men or women make the best knitters, will say that the women in our locality make the best knitters for good work and least waste.

I have in mind three married women, working for us at the present time who are hard to beat for doing good, steady work and giving the fixers a minimum amount of trouble. In mills with which I have been connected I have known the women to continue working even after they were married and, in most cases, they work more steadily than the single girls. We always have less labor turnover where women are employed in our ladies' department. In the half hose department the women make by far the best knitters. I have seen boys and young men learn topping and knitting, but as a rule they only stay on the job a year or two, where women work at knitting for fifteen or twenty years.

When I was still at fixing I always tried to educate the knitters who worked for me. When they asked me to fix a machine I always asked them what was wrong, whether it was looping in the heel or toe, picking trouble, or something else that was wrong and in that way they could quite often tell me what the difficulty was instead of my having to hunt for it. S. T. (PA.)

EDITOR COTTON:

"Knitting Kinks" is certainly coming into its own. In response to "K. L. J. (Ga.)" in the June issue of COTTON concerning the question, "Do Men or Women Make the Best Knitters?" will say that this is a very broad subject, but I will endeavor to give my view of it.

It depends largely upon the kind of knitting that is being done as to whether men or women are best, for instance, we have what is called string knitting, that is, a line of machines say eighteen or twenty in a line, and on this kind of knitting I would rather have a man for the reason that he is better able to be on his feet all day than a woman. We all know that it takes time and patience to train a knitter, someone who will take an interest and feel it a duty to get out the best work possible. "K. L. J." says that he has men knitting and has girls topping for him, also that his system differs from most mills. He is certainly right. It has been years since I have heard of such a system. I thought it had been done away with in all the mills. However, he has a good reason for continuing it. Personally, I do not care for it, as if a topper should stay out there must be others in reserve or there will be four of the eight machines stopped. My idea is to have girls top and knit, just giving them enough machines to handle and requiring them to inspect the work as it comes off the machines. However, they must be trained to do this.

I am sure that "K. L. J." has never seen a girl fixer in his life, as that is entirely out of their line, but let me say the women as a rule are good judges of machine oper-

ation and I have noticed that they can advance good ideas, especially concerning the machines that they run. I first noticed this when I was on a big looper job. Sometimes, as we all know, a fellow will have what we call a "Jonah," that is to say, one that is giving lots of trouble and sometimes requires hours to adjust. I had a woman teacher. I was working on "Jonah," a set of trimmer blades at the time giving me trouble. The girl asked that they be sharpened; unconsciously I told her to get Mrs.— to sharpen them for her, which she did, and, to my surprise, had the trimmers off, sharpened and the machine going in just a few minutes. In a few days she was sharpening most of the cutters.

Now getting back to the subject of girls making better toppers and knitters than do men and boys. The girls' fingers are more nimble, and it is just a woman's job to do tedious things such as topping, looping, seaming, sewing, etc. I make it a point to use girls on my topping and knitting. Of course they have stools to sit on, and they can do a good day's work for the reason that they can sit or stand.

Men knitters are thinking that sometime they will be fixers. They should do this. I admire a man who wants to climb, but care should be exercised in the selection of a man to learn fixing. They most all learn to put in needles and sinkers and then pretty soon they want to fix and really think that they are entitled to a try-out. A fixer must be cool, take things as they come and be a real honest-to-goodness fixer. I have taught a few who developed into good fixers on knitting, looping and sewing machines. It took all my time and patience, but was worth it.

Now just about the only thing on which "K. L. J." and I differ is where he says: "If we use a girl knitter who does her own topping, she doesn't have time to look over her work while the machine is running out." I don't believe that a man who is running eight machines has the time either. Give a good girl the number of machines that she is supposed to run and I venture to say that she will get out just as good work, or better, than the man. This must be true, as one cannot find many mills where men are used for knitting and girls topping. Personally, I do not want it. If there are not enough girls in the locality, go out and get them. It does a fellow good to have competition for help for it makes him hustle and makes him appreciate them.

I like the encouragement idea of which "K. L. J." speaks. He is absolutely right. The greatest way in the world to get the best out of a fellow is to give him a little encouragement; tell him that he is doing fine. It will inspire him to a more determined effort to win further approval by doing still better work. W. H. H. (Ga.)

Why the Stockings Vary in Size.

Editor Cotton:

In answering "A. B. C. (N. C.)," with reference to his question—why stockings vary more in size during the night run than during the day run—it is difficult to reply without actually seeing the conditions that exist on the machines. He states that his yarn tensions are not tampered with, his cylinders are not sticking, and the mechanical condition of his machines are not changed in any way.

In my opinion, the trouble is humidity. The humidity being greater at night than during the day time. "A. B. C." mentions, if it is humidity, then why is it that it affects some machines and not others, at times? This is due to the fact that the top layers of yarn on the cones are affected more than the layers toward the middle and bottom of the cones. Naturally, every time a cone is changed, it runs tight until it gets toward the center of the cone; then it loosens up a little.

In a room that has humidifiers that are kept going properly all the time, little trouble should be had along this line.

If the surplus stock of yarns is kept in a conditioning room and taken directly to the machines as needed, this should help out a great deal; otherwise the only solution seems to be to adjust the machines as needed.

If the work was running loose instead of tight, this of course would not be the source of the trouble, but the fact that it is knitting tight leads me to believe that this is "A. B. C.'s" rouble. Rymi.

Editor Cotton:

I note the question asked by "A. B. C." with reference to artificial silk hosiery running tighter on the night shift. It seems to me that the trouble mentioned must be due to varying amounts of moisture in the silk. The machines are all of the same kind, the cylinders are down for sizing, the tensions are not tampered with and the silk is not wrapped around anywhere. Therefore it must be the condition of the silk.

I have seen numerous cases on our machines which seem to prove this. Adjacent sections on the same machine, with necessarily identical adjustment, often make hose that show a variation of as much as one inch in length due to cones of different moisture content.

I hope that this experience will throw some light on the subject. H. O. M. (Mass.)

Editor Cotton:

Regarding the question from "A. B. C. (N. C.)," it is my opinion that the trouble he is having is caused by the difference in humidity in the day and night atmospheres. However, I have overcome this trouble to some extent by using compensating tensions along with the regular disk tensions. Another thing I found would help is a good strong spring attached to the cylinder raising tube to insure its always dropping. A common screen door spring will serve the purpose. I. T. T. (Tenn.)

National Erie Bordeaux B is a new dye which yields bluish-red tones on cotton and artificial silk, both viscose and tubize, and will prove useful for the production of shades similar to wine, garnet, mulberry, etc., when used either as a self-color or in combination.

This new product possesses excellent solubility, dyes level, is of good fastness to light, and of general good fastness to both washing and crocking, properties which should suggest its use for many purposes. Owing to its excellent dischargeability with hydrosulphite, it is recommended for all classes of cotton fabrics that are subjected to this process.

In general, this new dye will serve many purposes in the cotton and artificial silk dyehouse when a bluish-red is employed. It is fully described in Bulletin No. 50 of the National Aniline & Chemical Co., a copy of which can be obtained upon request from any of the branch offices.

The Yarn Market

Nature made opportunity out of man's extremity for a salutary effect upon yarn prices, as indicated in the Philadelphia cotton yarn market during the past month as reported here. Conditions were fortuitous for a material improvement from the standpoint of the spinner, a result of accumulating influences that have been forming for months. But there was much speculation and discussion in the market as to whether in view of these conditions, the spinner would follow the unfortunate procedure of increasing his production on prospect, and glut the market again; emulating the canine who relinquished the meat he possessed in the prospect of securing that reflected back to him from the water as he stood on the bridge.

Commentators declared it would be in pursuance of precedent to see the spinning end adopt this course of putting the mill on night and day operation when business showed itself on the horizon.

Then at the appointed time a severe drought occurred in the southern section of the industrial field which enforced a drastic curtailment of operations in all industry, affecting the yarn producers with the rest. The curtailment ranged from twenty to forty per cent of normal operations in different localities, and made its impression upon plants producing their own power as well as those securing purchased power from the large hydro-electric organizations.

The result was that the course the spinners would have followed without the interference of the drought will be among the what-might-have-beens. It is reasonable to assume, however, that with the effective organization through which they are now operating, the spinners would not have radically affected the market by over-time operation; not so much as would have been probable without a centralized information bureau.

Insofar as the demand for yarn during our month was concerned, there is nothing of especial value to report, as the situation has continued with a hand-to-mouth purchasing policy on the part of most yarn users. The knitting industry, especially, has been markedly active and of course has taken its share of yarn production. These purchases, however, seem to come on the short inventory basis, as most yarn users now appear to be inclined away from the policy of long-time commitments. There was undoubtedly a favorable amount of business transacted, but it came in small portions.

Prices, insofar as the general trend was concerned, found a higher common level over the period. The fluctuating activity of the cotton market had its effect in some respects, but still yarn rates seemed to have a will of their own, for stability was in evidence. Spinners continued their policy of firmness and secured prices more commensurate, in their figuring, with their costs.

A demonstration came during the first part of September, when yarn rates, following a cotton slump, took their first general reduction in about six weeks. Dealers made commitments with customers at lower levels, only to find later that a more positive stand taken by the spinners, aided by a recovery in yarn prices, did not permit their disposing of the goods at the cheaper rates. This affected the buying end to a certain extent also.

The period covered here included several crop and condition estimates, which caused flurries to and fro and out of the combination of these reports, together with the approach of Fall, a more stabilized market has evolved, and observers declare that the situation has turned the control more toward the spinner. Underlying conditions are admittedly good, with speculative tendencies disappearing, and reduced stocks everywhere from the mill on to the warehouses of users, and prospects are that business from the yarn market standpoint will show a definite improvement.

Quotations on the Philadelphia market on September 16th follow:

Single Skeins.

4s to 8s	37	10s	38
12s	38½	14s	39
16s	39½	20s	40½
24s	43½	26s	44
30s	45		

Single Warps.

8s	38	10s	38½
12s	39	14s	40
16s	40½	20s	40½ @42
26s	44½	30s	45½
40s	54		

Carpet and Upholstery Yarn in Skeins.

8s and 9s 3-4 slack	38
8s 3-4 hard white warp twist	37
8s and 9s 3-4 tinged tube	36
8s 3-4 hard twist waste	34½

Two-Ply Skeins.

8s	37½	10s	38½
12s	39	14s	39½
16s	40	20s	40 @42
24s	44½	26s	45½
30s	47	40s	54½

Two-Ply Warps.

8s	38	10s	39
12s	39½	14s	40½
16s	41	20s	42 @43
24s	45	26s	46
30s	48	40s	57

Frame Spun Carded Yarn on Cones.

8s	37½	10s	38
12s	38½	14s	38½
16s	39	18s	39½
20s	40½	22s	41½
24s	42½	26s	44
30s	45½	40s	54½
30s double carded	46½	30s tying-in	44

Two-Ply Combed Peeler Skeins and Warps.

8s to 16s	55	20s	56
24s	58	30s	60
40s	68 @70	50s	76 @78
60s	85	70s	95
80s	$1.08÷$1.10		

Single Combed Peeler Yarn on Cones.

18s	48	36s	63
24s	53	38s	65
30s	60 ÷61	40s	66

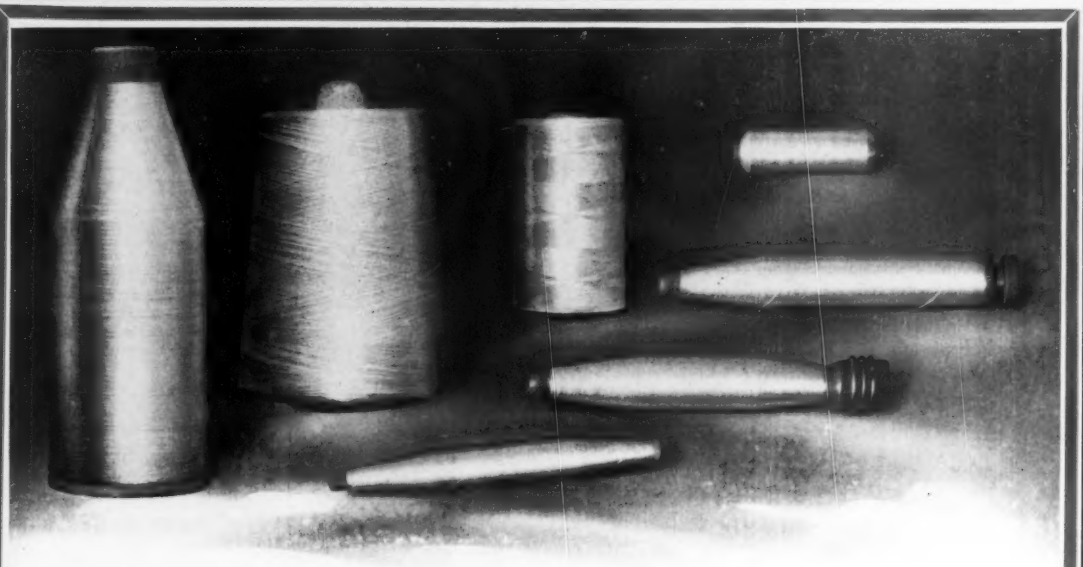
Mule Spun Carded Yarn on Cones.

10s	42	12s	43
14s	44	16s	45
18s	46	20s	48
24s	49	26s	50
30s	51	40s	59

Mule Spun Combed Peeler Yarn on Cones.

10s	50	12s	51
14s	52	16s	53
18s	54	20s	55
22s	56	26s	60
28s	61	30s	62
36s	64	38s	67
40s	70		

Sandoz Chemical Works, Inc., 238 Water St., New York City, have brought out three direct fast cyanines, in response, it is announced, to a demand for cheap direct blues of better fastness. These products, it is stated, are discharged white with hydrosulphite and are of good fastness to acids and alkalis. Xylene Light Red 2GL is another addition to their range of level dyeing colors, it is stated, this being suitable for self-shades or in combination with other fast to light level dyeing acid colors. Good fastness to hot pressing, rubbing, perspiration, alkalis, washing and carbonizing, it is claimed, make it useful for the dyeing of ladies' dress goods, upholstery, mohair, drapery materials, etc.



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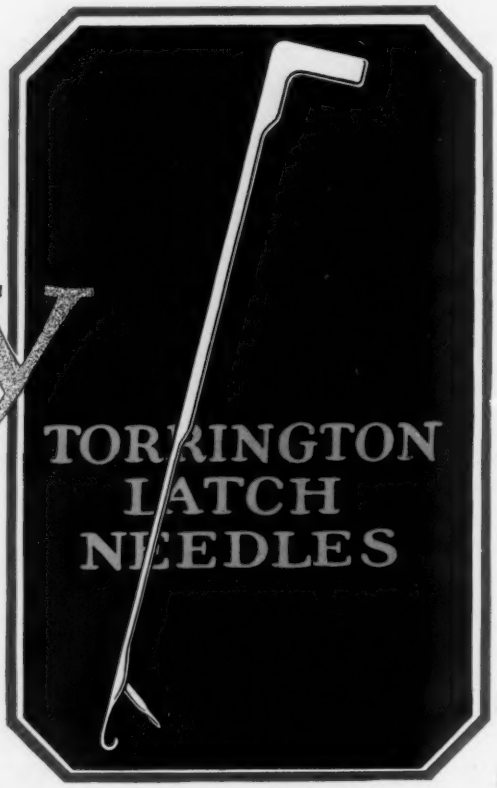

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The Knit Goods Market

The hosiery primary market shows more strength than briskness. That there is not more pronounced evidence of the latter element can be ascribed to ultra-cautious buying by the jobbing trade. There were several factors last month which might have been reasonably believed to cause distributors to operate with extreme conservatism. These included, of course, the idleness of 150,000 miners in the Pennsylvania anthracite coal belt, due to the strike which went into effect on the first of the month, and the attending feeling of uncertainty, and the fact wages of mill operatives in New England were being adjusted on a lower level to conform more nearly to market conditions.

Contrary to the expectations of some market forecasters, the strike of miners purely local in its influence on merchandising, had no perceptible adverse effect. Merchants in the coal fields cancelled a few orders, something that jobbers had discounted. But what was lost in this respect seems to have been compensated for in new business that was placed. As this was true especially of sweaters it must be apparent that underwear and hosiery suffered little, if at all. An amazing phase of the situation there was that some retailers were filing repeat orders and calling, in some instances, for advanced deliveries. This may have been due to their restricted buying previous to the strike while overestimating its bad effect. The miners had been working steadily at high wages and, doubtless banking on an early termination of their controversy with the operators were spending their money.

There was reported some slight falling off in the business being placed by New England distributors, but what was lost there was more than offset by the volume coming from the South and the West. The agricultural sections in particular were free buyers of all classes of goods. About the only complaint heard in the markets of origin were on the score of continued piecemeal buying for Fall and Winter and the disposition to defer operating for Spring in a general way.

Serving to support prices of finished goods were the stiffening in cotton and rising prices for raw silk. The only raw material that wobbled was wool, its weakness necessarily being felt in greater measure in sweaters and bathing suits than in hosiery and underwear. But manufacturers in the knitted outerwear division had pretty well covered for their worsted yarn requirements at prices so low that a further drop of a few cents a pound in wool would not seriously affect them or their trade, and mills kept running at a good pace.

That there has been some uneasiness among manufacturers of hosiery is manifest in steadily diminished monthly production beginning with April, to and includng July, according to a Department of Commerce compilation of reports from around 400 mills. Comparing with June, women's full fashioned silk, and men's seamless silk, artificial silk and silk in mixtures were about the only ones to show an increase in July. Women's seamless silk and men's full fashioned suffered quite a decline in production.

In women's silk hosiery the trend clearly is toward full fashioned. Comparing with the first seven months of 1924, the production of reporting mills increased by almost 45 per cent during the corresponding period in 1925. Output of women's seamless silk, the reports indicate, fell off around 20 per cent. Cotton hosiery, including mercerized and novelties of certain types of construction, declined in production this year to the end of July by approximately 15 per cent in men's and a trifle less than three per cent in women's.

Export trade in hosiery is holding up well, amazingly so, considering the handicap of high import duties being imposed in England and several South American countries. Cotton hosiery shipped out abroad during the first seven months this year amounted to 2,870,291 dozens, the monthly average for that period being about maintained in July. There was a sharp drop in exports of silk and artificial silk hosiery in July, compared with June. This was to have been expected, as England took in large quantities in June for heading off the tariff which became effective there July 1. Total exports of artificial silk were 204,746 dozens in June and but 103,382 in July, a decline of 101,364 dozens. The falling off in shipments to the United Kingdom was 118,817 dozens, from 131,272 dozens in June to 12,455 in July. Total silk hosiery exports dropped in July to 83.655 dozens, comparing with 204,007 in June, a decline of 120,-342 dozens. Here, too, the total falling off was less than in the shipments for British account alone, the United Kingdom taking 168,052 dozens in June and only 32,040 in July, a drop of 136,012 dozens.

Despite the steady advance in raw silk, which last month was commanding the highest price in many months, large retail stores were offering considerable quantities of women's full fashioned and seamless silk hosiery at what appeared like distress prices. This left the impression the market was not as bare of goods as usually represented. Yet when buyers came to market for full fashioned they found nothing for immediate and but little available for deliveries until very late in the year. Most leading mills, and numbers of the smaller ones as well, were sold up to the end of the year.

The tight situation could be attributed, in great measure, to demand from direct-to-consumer sellers—concerns employing canvassers and those operating on the coupon plan. Between them they have done more to popularize full fashioned hosiery than probably any other agency, an admission made by not a few manufacturers. The king bee among the coupon operators is putting out a 12 strand stocking, and pays a little above the market for it, as part of an arrangement by which deliveries are to be made within 48 hours from receipt of orders. So far as known, coupon houses are the only distributors of hosiery willing to pay a premium to manufacturers for carrying stock for deliveries as wanted.

Modern distribution methods are making some mills more independent of jobbers and retailers. A Philadelphia manufacturer of women's high grade silk hosiery, for example, sells 10 strand to a few jobbers, carries a limited number of retail accounts, ships by parcel post on orders received from a canvasser, and feeds the hopper of a coupon house. This concern is less than two years old, started with 4 four flat machines and now is occupying every foot of floor space with equipment. The company would have constructed an addition to its factory building this year but for the fact it could buy no new full fashioned

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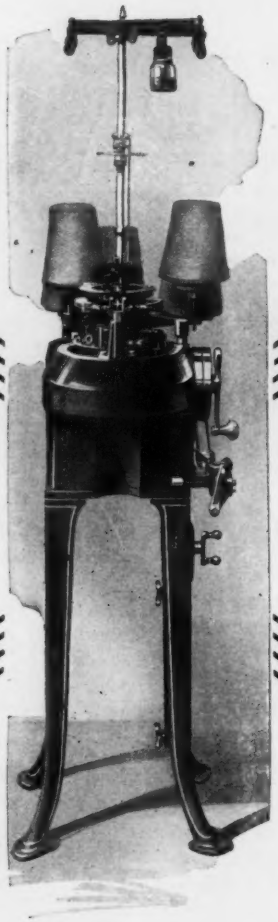

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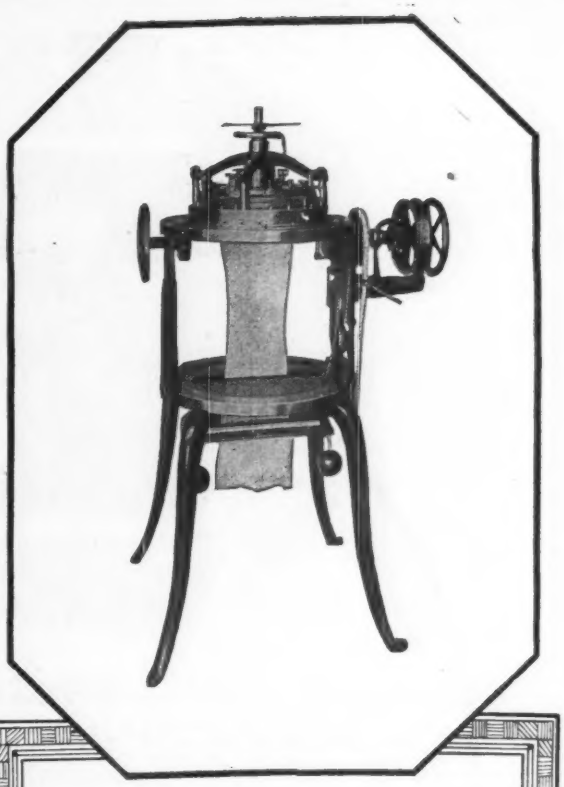
Scarcity of full fashioned silk hosiery was evidenced a few weeks ago when a buyer for one of the very large catalog houses was scouring the market in search of goods for nearby delivery. In his straits he even sought out several jobbers, who could only suggest certain mills as a possib'e source of supply. Notwithstanding the pressure on manufacturers, prices have not been advanced, except in isolated cases. To make a general advance, a well known mill executive says, would be suicidal. But it will have to come, unless raw silk declines from the September level. Manufacturers as a body are not well covered for silk. Comparatively few bought heavily during the early stages of the rise. Several forecasters advised buying from hand to mouth, stating unequivocally that the price would recede sharply. It will, but perhaps not until mills bare of supplies are forced to buy at current prices.

It is a common prediction that the production of full fashioned hosiery is being so measurably expanded that a surplus is inevitable. That is a possibility, but not a probabilty this year or the next. The American Federation of full fashioned Hosiery Workers will have to be taken into the reckoning. It had a meeting and election of officers in Philadelphia in September and took steps for strengthening the organization. A drive is to be made in Reading, where there is considerable union sentiment but no organization of knitters. For a month or two prior to the meeting union officials were active in trying to hold their ranks intact in Philadelphia, where there are a number of open shop mills employing both union and non-union help.

Union knitters are prohibited by their organization from operating more than one legger. Some were found who had kicked over the traces and not only were operating two, but working overtime as well, which is a serious offense in the eyes of the union. When they were called to time the working organizations in several mills were so seriously crippled that the factories had to be shut down temporarily. But in a number of instances union knitters who lost their jobs in one open shop mill went to another, and some were drawing as much as $150 a week, which was about $50 more than they are permitted by union rules to earn. Of course all the controversies were adjusted and there was comparatively little lost production by reason of union interference at a time when there was a demand for hosiery that could not be met.

Thus far the mills making high grade circular knit silk hosiery are in fairly good position as relates to orders on their books. They are, however, feeling the effect of the intensive exploiting of the full fashioned, and not a few manufacturers are eager for business. One, in the South, last month was able to offer goods to a coupon house. Few such establishments are distributing seamless hosiery. They may have to come to it or pay more for full fashioned if production of the latter does not overtake demand.

A good guess in women's hosiery is tram silk plaited on artificial. One type of stocking of this construction is made from three threads of silk plaited on one thread of 150 denier artificial, costing jobbers around $6.25 a dozen and, ordinarily, a dollar-a-pair retailer. A department store having a special sale marked such a stocking down to 63 cents, as a leader. For advertising purposes it was not a bad offering at that, as it yielded the store a margin



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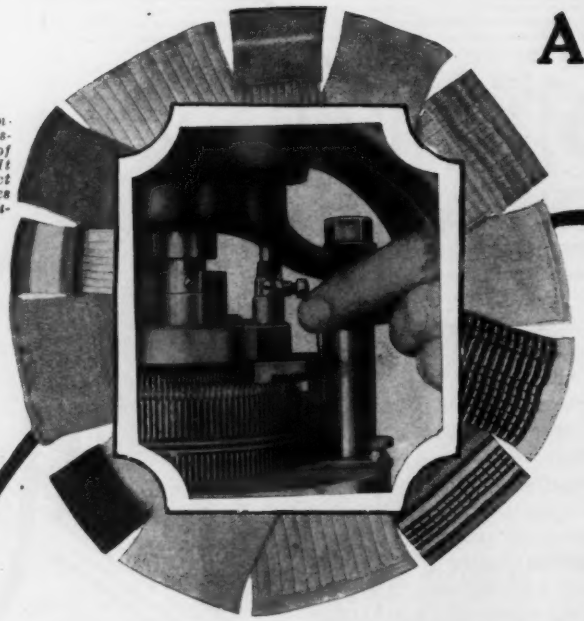

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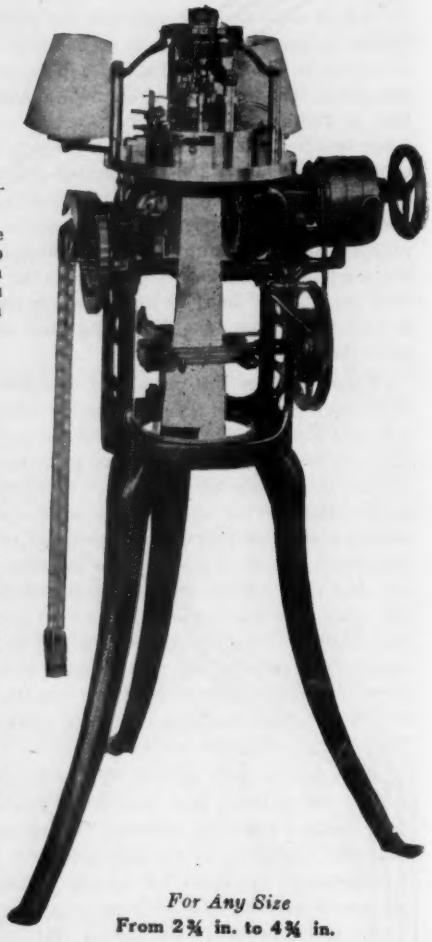

Here's an improvement in hosiery ribbers which cuts production costs at the same time that it insures better work.

Just notice how easy it is to get at a whole section of the dial on a Universal Ribber. Merely loosen a convenient thumb screw and swing back the gate latch, exposing a whole section of the dial. Think what such accessibility means when a jam occurs, when a needle bends or when you want to straighten a dial wall!

UNIVERSAL HOSIERY RIBBER

"The Latest Development in Hosiery Ribbers"

Progressive mills are finding that Universal Ribbers *cut production costs.* They find Universal machine heads are interchangeable without new dogless or parts from sizes 2¾ to 4¾ inches. Elimination of vibrating parts in the dogless eliminates vibration in the machine itself. A new type loose course plate that reduces needle breakage—means fewer stops and repairs. There are no exposed gears on the take-up to gather dirt, and clog.

The fabric produced on a Universal not only costs less to make—it is *superior,* smoother, evener, truly elastic and better fitting, due to improved stitch formation. As such it is preferred by discriminating hosiery buyers, therefore more profitable to the manufacturer. It will pay you to investigate a Universal Hosiery Ribber.

For Any Size
From 2¾ in. to 4¾ in.

FIDELITY MACHINE COMPANY

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12 Broadway NEW YORK CITY
James Building CHATTANOOGA, TENN.

THE UNIVERSAL HOSIERY RIBBER

of about 12 cents a pair. High price Japan silk obviously is serving to promote the use of artificial silk in mixture.

While some factors express doubt that chiffon hosiery will retain its Summer popularity during the Winter months, the major opinion appears to be that it will, at any rate, be worn more extensively than last Winter. Taste is running toward lighter fabric, and eight strand silk, sometimes referred to as semi-chiffon, is said to be in stronger call than any of the heavier weights. In the high priced lines there is interest in ingrain goods, usually sold in only specialty shops and department stores having the better class of trade.

Women's plain standard 220 needle mercerized hosiery figures largely in the export trade. In sports lines mercerized fills a rather important niche. It is a big item in men's and boys' golf hose, lines which are keeping several Philadelphia mills on overtime schedules.

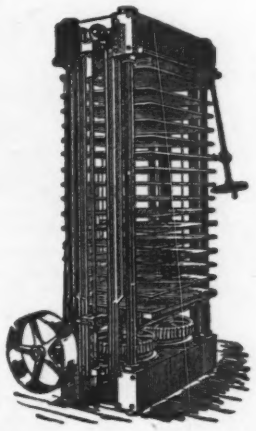
Juvenile hosiery has been pretty well sold for Spring. This is one line which jobbers felt safe in making forward commitments. Mills are fairly well advanced on work of this kind for 1926, having gotten an earlier start than for some years. For the present new business in juvenile goods probably will be in light volume. Some duplicate orders for certain popular numbers have been placed, but no great activity in this respect is looked for until after a further canvass of the retail trade has been made. Jobbers are waiting for developments also as to infants' socks, in which new business is lagging. Mills are sold well ahead, however, and may be in no need of additional orders for several months, as jobbers have been more prompt than usual in supplying color and size specifications.

Retailers are reported placing open orders for Fall and Winter at a rate indicating they are confident of a brisk trade between now and the holiday season, a period for which there has been much preparation in the way of glace envelops for individual packing and Christmas cartons. But the average dealer, manufacturers say, is sending specifications through so slowly that it is difficult to plan ahead for their Fall and Winter campaign. "We have plenty of orders but are shy of details," it is stated by manufacturers selling direct to retailers.

As it is pretty well understood that colors for Winter have been decided upon—that there will be little deviation from the current range—the withholding of details is regarded by some manufacturers as indicating a disposition on the part of dealers to leave an opening for cancelling. In any event, mills have got to carry stocks for the merchants if they want to feel assured of being able to accept all the business that may be offered as times brisk up with the nearer approach to the December holiday season.

The F. Y. Kitzmiller Sons Co., Reading, Pa., selling to retailers, specializes in minute service. The company, owner of the Notaseme brand, frequently has parcel post deliveries in the mail within an hour of receipt of a hurry-up order. The mill still is being operated by the receiver, Charles E. Leippe, from whom the mill in Reading was acquired about two years ago. The affairs of the receivership are in good shape, it is stated, and the factory is operating on full time schedule.

Practically every hosiery mill in Reading is having capacity output, some working overtime. The Berkshire Knitting Mills for some time has been operating 5½ days and two nights a week. The company denied last month



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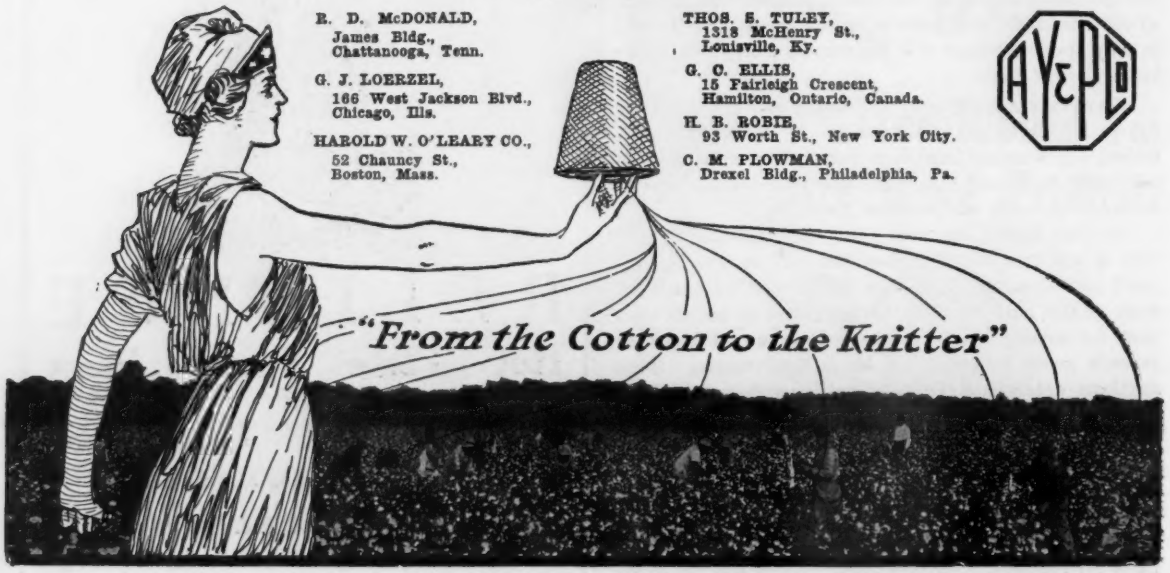
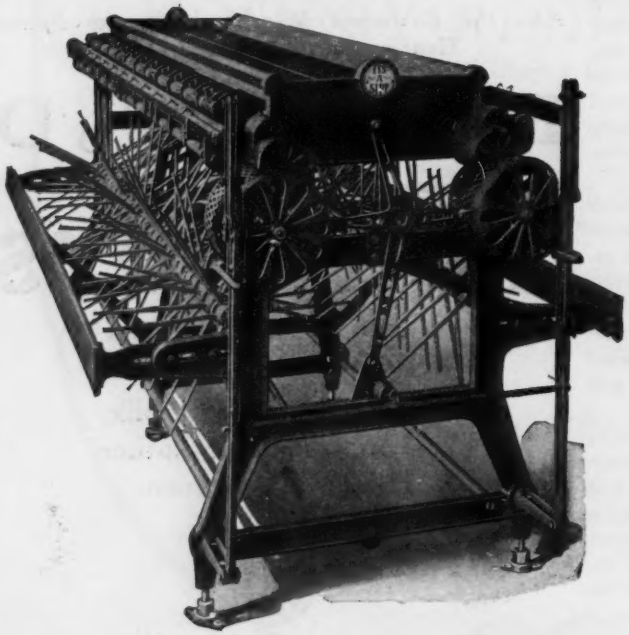


AN IDEAL WINDER FOR ARTIFICIAL SILK

ITS TRADE MARK SIPP



THIS winder can be used for hard and soft silk and fine cotton yarns.
RIGID TRAVERSE MOTION. This is a radical departure from the usual traverse motion commonly used. Our patented construction insures uniform spools without frequent re-adjustment of traverse motion.
SPINDLES, are of the double drive type being driven from both ends which assures smooth running spindles which gives a better wound spool with ends built up with extreme accuracy.
METHOD OF SHIPMENT. Machines are shipped set up complete in sections, it being only necessary to couple sections together when received.
There are many other features. Write for circular giving further details.
Also manufacturer of 6 yd. and 8 yd. Warpers.
Quillers Reels Raschel Warpers and other silk machinery.
Also V Creels for use with Sizing Machine.

THE SIPP MACHINE CO., PATTERSON, N. J.

that it had sold any goods for 1926 delivery. That may have been contemplated, but if so, the plans were halted by the rise in silk.

Manufacturers in Reading are going strong on novelty half hose. Those who are admittedly pushing novelties profitably and with a promising future bring out new patterns at short intervals. By the time one begins to wane in popularity samples of another are in the hands of manufacturer and jobber, samples are closely guarded until those for selling purposes are shipped out, all distributors handling a given line receiving their samples within the same week. Thus there is little opportunity for rival manufacturers to copy a new line and all jobbers start out on an equal footing. All buy at the same price and it is up to them to sell their allotment by the time a new number makes its appearance. Of one mill line put out on this plan, sales by jobbers exceeded the allotments and the number was continued for a longer time than had been contemplated. The mill is in arrears with deliveries, according to several jobbers, and some orders placed in September cannot be shipped out before November. The mill seems to understand merchandising as well as making socks for men.

Since novelty silk hosiery for women proved a disappointment to numbers of manufacturers this year, there is some scepticism as to how much longer the craze will run in half hose. Optimists for novelties say they will be popular just so long as manufacturers improve on successive patterns, and one mill executive, states his designer, is five years ahead of needs in this respect.

It will be unsafe to predicate opinion of the life of novelties for men on the failure of women's to make a lasting hit. Woman realizes that for improving on nature, so far as relates to what is below the hem of the short skirt, plain silk hosiery in colors—white in Summer—fills the bill better than a conglomeration of patterns and colors. Man, on the contrary, needs something in the way of dash and splash to set off what appears between the bottom of the trousers and the top of his shoes, and he is prone to follow the collegiate, for whom there seems to be nothing that is too "noisy" in the way of style.

It will not be overlooked that there is considerable cotton hosiery in patterns, and cotton heathers seem like a good proposition for Fall and Winter, as they meet requirements in appearance and are in the moderate price class. It is significant that, after all that has been said about the decadence of cotton hosiery, cotton half hose holds up well in the production statistics.

That there is a sound situation in hosiery as measured by available supplies among manufacturers was revealed on a tour of inland Pennsylvania establishments by a commission merchant last month. He says he visited nearly 40 mills, and that nowhere was he able to find bargain stockings. That is, no one had close-out lots at a sacrifice and there was no abundance of irregulars and seconds. Where such goods were located manufacturers were, as a rule, holding for slightly more than this buyer was willing to pay—and he is rated "a plugger for goods."

Seconds of all classes of silk hosiery and the more desirable cotton lines are scarce and in good demand. It doubtless is true that irregulars figure extensively in some of the special sales where low prices are seen and where buyers do not have the fine sense of discrimination that is in evidence in shops of the better class, where price is less

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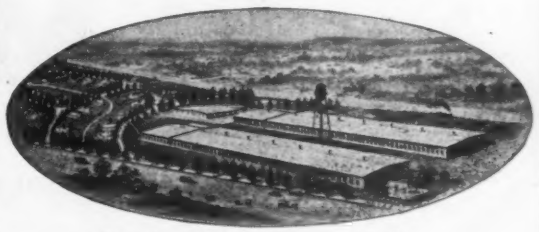

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Selling Agents COTTON PRODUCTS CO., Bankers Trust Bldg. Philadelphia

a factor in the volume of goods passing over the counter.

Spring needle silk hosiery was hard hit by the falling off in business with the United Kingdom, and gave latch needle silks the keenest competition they have had in a long time. But, it is stated by manufacturers, the British were quick to adapt themselves to prices made higher by a tariff imposition and buying has been resumed on a right good scale. The spring needle stocking is much liked in British markets and has made a right fair start in several South American capitals. It has made its debut in chiffons in the domestic market and can be put over the counter profitably at a dollar a pair. The Starr Knitting Mills, Philadelphia, recently brought out a spring needle line with double and triple resist stripes, for the somewhat exclusive trade. The company is making six thread chiffons, 10 and 12 strand silk and two numbers of silk and artificial silk in combination.

In the latch needle division, where, as a broad proposition, conditions are not as satisfactory as some months ago, the better situation is found in mills operating 260 needle machines, but which, it appears, are more interested in silk plaited on rayon than in the straight silk boot stocking.

The manufacture and distribution of hosiery has come to be an interesting game, in which there is being recorded no little elimination. Of 405 mills reporting to the Department of Commerce for July, 35 had no production.

Underwear.

The bigger business in underwear that was expected to develop following Labor Day did not materialize. With Summer temperatures prevailing there was little incentive for retailers to place orders for heavy weights, and they had about finished their light weight season. In the circumstance jobbers were inclined to keep hands off for the time. It was the opinion that the outlook as to nearby business in winter weights was largely a weather proposition, and it was admitted that a few blustery days would precipitate sudden demand and disclose numbers of distributors illy prepared.

Some jobbers say they have sold more heavy weight underwear for men this year than to the corresponding date in 1924. How well jobbers are covered for prospective needs is a conundrum, some who say they did not contract heavily, stating "we are well covered, relatively, that is, considering trade and weather conditions." As the big mills in the Mohawk Valley have been operating steadily on sustained work schedules it is believed jobbers in the main are pretty well provided for, as it is doubted mills will put goods in stock. A Philadelphia jobber says two mills with which he placed contracts are in arrears with deliveries, which means this house has had a fair response from retailers.

A leading buyer says there is nothing in the underwear situation for pessimists to "crow about." With the rural districts practically unaffected by a few quiet spots in industrial cities, he says, the usual quantities of heavy weights will be sold, and there is no indication that city folk are going short of light weights. Necessarily, when cotton was softening, under official estimates of a crop of 14,000,000 or more bales, buyers were waiting for lower prices. If there was any shading, it is known only to the sellers and buyers involved in transactions where concessions were granted. Prices have continued firm, and there is more reason now than a month ago for believing

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"The Wonder Tension"

Insures Perfect Plating—Even Lengths—Smooth Weave and in every way a Quality Product.

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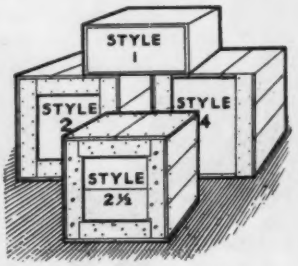

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SOME OF THE LARGEST MILLS ARE USING OUR BAR PRINTERS.

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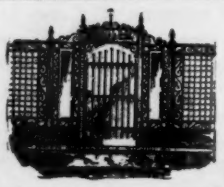

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they will hold until the end of the distribution season. There is the remote possibility of slight advances if much buying be deferred until the eleventh hour, as was the case last year.

For a time there was a reported shortage of 14-pound cotton ribbed union suits for nearby deliveries. A few mills, it is known, had none for immediate. It is easily conceivable that 14-pound suits suddenly came into better demand as a price expedient, particularly as the trend is to lighter clothing and old timers say the winters are not as severe as they were, in the memory of even the younger generation.

Some manufacturers of women's medium weight cotton ribs can boast of having had a good season. The Glorie Underwear Mill, in Reading, can be included among these. The company is preparing to remove a large part of its light weight equipment to a branch mill to be established in Eufaula, Ala., where its light weights for the next season will be made.

In view of woman's weakness for underwear of silk and artificial silk, it is felt the use of medium weight cotton garments will be deferred until temperatures force a change, and it seems probable a lessened output of the cotton will be ample for successive seasons. While silk is the high spot in women's underwear, rayon is fast making friends. It has suffered some from the exploiting of cheapened garments made from artificial silk, but these are gradually being eliminated, while the best is being improved.

The better jobbers advise their trade to give no consideration to stuff offered for a price. Canvassers and coupon houses distribute the better grades and are active as missionaries in the promotion of the use of rayon underthings. These are being put in stock in a big way for the holiday trade. Rayon underwear and bal briggan cloth and jersey fabric just now are items of much importance in the knitting trades, and second-hand machinery suitable for such products never was in greater demand, especially for experimental purposes.

Retailers still are buying conservatively of men's light weight knitted underwear for the 1925 season. To date they have bought very little for the summer of 1926. Jobbers, therefore, are practically out of the market and not much business is expected from them for another month or two. Meanwhile mills will be steadily engaged on their initial orders, which to some lines, run larger than last year.

The trade sees a bright outlook for nainsook athletic underwear, and for this reason jobbers are likely to be slow with their repeat orders, for the knitted, unless developments in the remaining months of 1925 disappoint those interests banking on nainsooks. The latter are being shown in rare novelty effects and seem certain of giving bal briggans and ribbed suits a run for supremacy.

Apathy has given way to activity in the sweater trades. Mills are better employed than for months. Some few in Philadelphia, depending on the types of goods they are making, are operating overtime. This is far from general, and there are manufacturers who easily could accommodate more business without expanding their single shift schedules. One difficulty encountered is that jobbers often do not know what they will require in the way of style, and many are buying lots of six dozens months after they ordinarily would have contracted for sixty.

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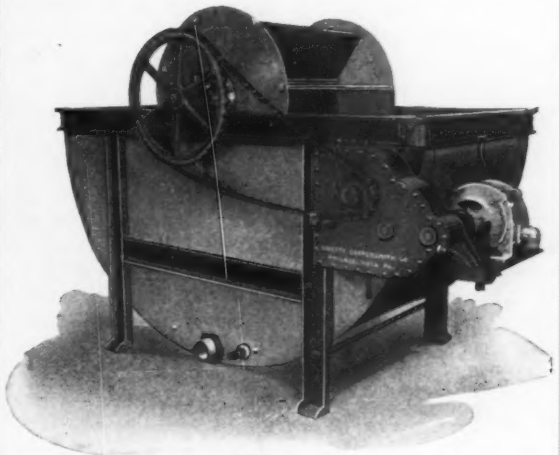

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Established 1866

160 Fifth Avenue **New York**

Some of the larger department stores did not place their Fall and Winter orders until the middle of September, weeks after the South and West had operated.

"The department stores are as bad as the jobbers in trying to force mills to carry stocks for them," said a local manufacturer. Some jobbers complain that deliveries are late. Manufacturers admit this to be true and explain by saying orders were late. A mill making men's, women's and children's staple garments produces ten sizes each in ten colors, and necessarily may not have some of the items specified in an order.

Mills making golf sweaters and stockings to match appear to be the better situated, and it is these that are under pressure for goods, particularly if they are selling to the retail trade. While jobbers say they cannot tell what style of garment is going to sell, some retailers are taking in goods against orders placed months ago, and some are calling for advance deliveries. It is a guess in the trade whether shaker sweaters will be in good call. Most factors say they will be. The windjammer and turtle neck types are counted on as winners in the style race, and cricket coats seem good for a continued run.

Sweaters for women had a quiet session in the Spring and Summer seasons. There is confidence they will come back for Winter use, but as novelties are a craze no one, in the East, it is stated, is stocking up heavily. Staples and sports coats are the big items for Fall. Samples for the 1926 season will be shown in November, about the time the southern cotton ribbed underwear manufacturers come out with prices for next year.

Mill Guarantees.

The liberality of hosiery manufacturers in guaranteeing their product to "give entire satisfaction" to the consumer is exciting no little comment in the trade. Some factors see in the practice the beginning of trouble for those having recourse to it, obviously as a talking point for dealers. Announcement was made a month or two ago by a Philadelphia woman's specialty shop that every pair of a certain line of silk hosiery was sold under an unconditional guarantee. The prices of the several numbers run from $2.25 to $2.75, and possibly covered the estimated cost of returns as a result of the guarantee.

This was followed by a mill coming out with a line of dollar-a-pair circular knit silk hosiery costing retailers $8.50 a dozen. The rider ticket sets forth that "a pair will be given free of charge if these do not prove entirely satisfactory."

The Cadet Knitting Co., Philadelphia, selling the retail trade, prints under a display advertisement of its line of children's stockings the line "Unconditionally guaranteed."

Now that the ball has been started rolling, it is predicted in the trade, numbers of manufacturers will give it momentum. It is not believed distributors asked for such a guarantee. The inference is that it is an outcome of extraordinary competition among manufacturers. One says that while his company makes no pretense of guaranteeing its hosiery to give absolute satisfaction, it is the custom to accept returns on any reasonable pretext. But the evil lies in the possibility of unscrupulous persons abusing the guarantee. A retailer cites an instance in which a pair of stockings was returned in bad shape after being in a scrimmage at a dance. They had been damaged; there was nothing wrong with the fabric or construction. Rather than have a controversy with the customer, the shopkeeper handed the woman the price of the stockings, told her to keep them and requested that she transfer her patronage to some other establishment.

The hosiery buyer for one of the better known department stores says he attaches no significance to a manufacturer's printed guarantee. "When I buy goods for the store," he said, "there is an implied guarantee that they are as represented. If they prove otherwise, back they go, and the class of mills from which I buy accept them, of course. Whether the goods are or are not guaranteed to us, there is an implied guarantee by us to our customer that they are all right. If the customer did not have confidence in us she would not be much influenced by the guarantee of the manufacturer, and his promise to 'make good' only encourages the return of goods that, while they may be all that we represented them to be and all that the customer expected of them, may, for some reason, not be entirely satisfactory. But under the 1925 model of guarantee they would be subject to return to the mill, through the store that sold them."

An underwear buyer, who also is not enthusiastic over mill guarantees, says his establishment sells a line of women's wool underwear which the manufacturer guarantees will not shrink. "We know from experience," he said, "that excessive perspiration is liable to cause the garment to shrink. Therefore we are not willing to get back of this manufacturer's guarantee. If a garment that we sold should shrink and be returned to us for that reason we would, of course, return it to the mill and request another in its stead. But the customer absolves us from blame in the event the garment shrinks, as we did not guarantee it."

Canvassers for one leading direct-to-consumer establishment doing an enormous business sell under an absolute and unconditional guarantee, and some hosiery factors say this probably is the reason why mills selling to jobbers and retailers have resorted to the practice, as with the average retailer it is "anything to put the canvasser out of business," to which some manufacturers say "Amen."

The Fafnir Bearing Company, New Britain, Conn., manufacturers of ball bearings and ball bearing transmission equipment for textile mills and machinery, announce the publication of a new "Catalog of Industrial and Textile Applications," which can be obtained by writing to the factory at New Britain, or through mill supply houses handling the Fafnir line. This catalog supercedes an older one and deals with the application of Fafnir ball bearing units to shafting and textile machinery. It is illustrated with photographs of actual installation in mills and contains complete and up-to-date data on the principles of ball bearing transmission and textile applications. The catalog is divided into two sections, the first dealing with transmission equipment, such as hanger boxes, pillow blocks, fan boxes and loose pulleys and the construction of the Fafnir line, latest dimensions, etc. The second section deals with textile applications proper, such as picker beater and fan shafts, cards, slashers, spinning frames, etc., together with the advantages of ball bearings on each one. Individual Fafnir applications for various makes of machines are shown, with mounting dimensions and construction details.

More Different Weaves

Have been successfully produced on the Northrop Loom than on any other Automatic Loom.

You may buy the loom to make print cloth. If you want to run silk filling or make denims or light duck or any other of the many varieties of cloth within the range of that weight of loom, we have the parts to apply and the loom is made to take them. Experiments are not necessary. It has all been worked out.

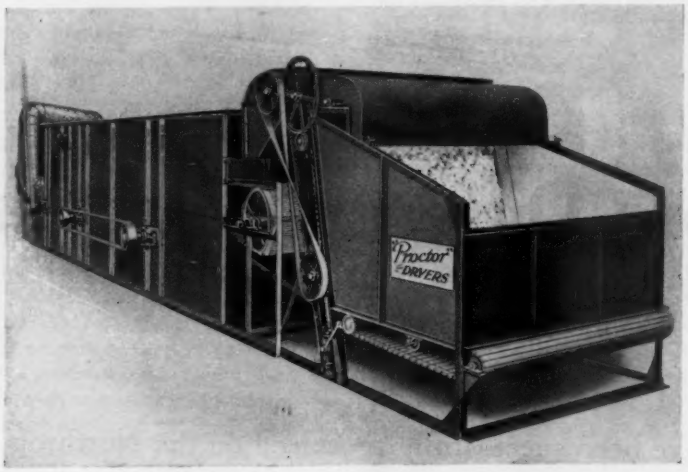
If this interest you, **Let's Talk It Over.**

DRAPER CORPORATION

HOPEDALE MASSACHUSETTS

Southern Office Atlanta Georgia

Copyright 1917 by Draper Corporation



Proctor Automatic Dryer for Bleached and Dyed Cotton

Drying Machines for Every Step of Textile Manufacture

Truck Yarn Dryer

THERE'S hardly a drying operation in all textile manufacture with which Proctor Dryer engineers are not fully acquainted. There's scarcely a textile product for which they cannot specify the best means of drying.

This intimate knowledge of approved drying practice is the result of forty-one years' drying experience, during which Proctor Dryers have been evolved in a variety of types which covers every step of textile manufacture.

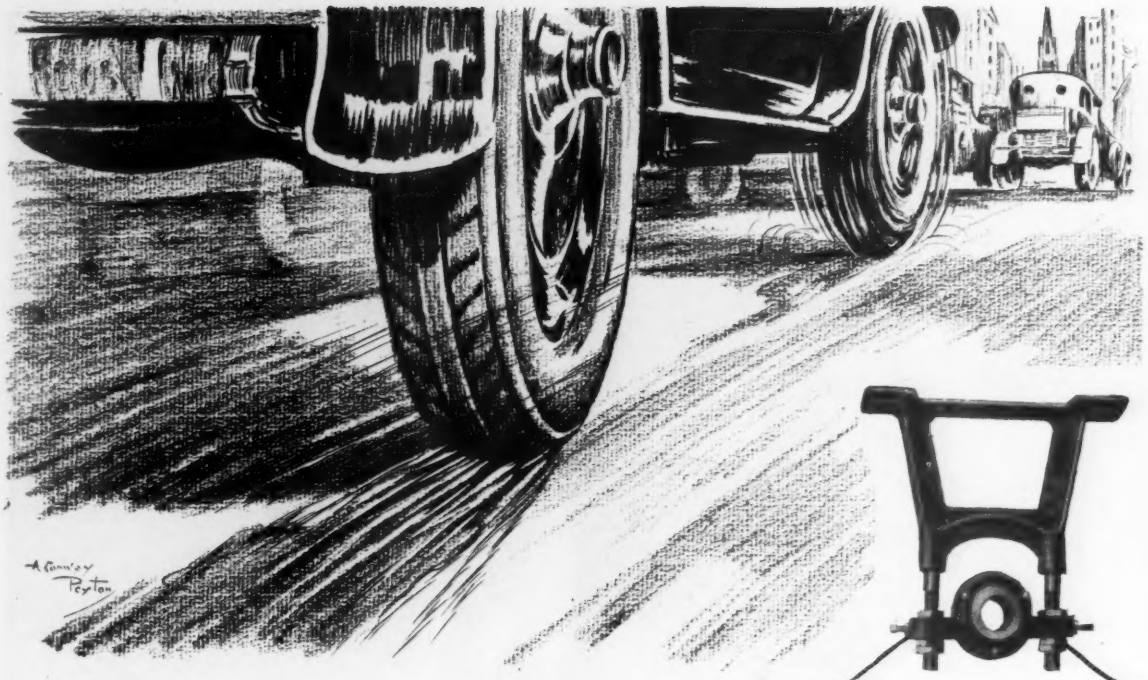
There are automatic conveyor types of Proctor Dryers for raw cotton, wool and other loose materials; there are automatic and truck types for skein yarn; tray types for package yarns; automatic dryers for warps.

In the finishing stages—for drying piece goods of all kinds, hosiery, carpet; for carbonizing woolen cloth—there are Proctor Dryers, each the best for its specific purpose. And a Proctor housing to increase the efficiency of your tentering machine.

Is there some drying rut in the otherwise smooth road of your production? If so, why not draw on the experience of this organization to help you smooth the road all the way?

PROCTOR & SCHWARTZ, INC.

PHILADELPHIA



Where There's Friction
There Must Be Waste

YOU have seen them—long gray smudges on the pavements where brake-locked wheels have ground rubber against asphalt and literally *burned* off part of the tire. And you know, of course, that friction between road surface and tread has robbed the tire of miles of useful life.

But do you know to how great an extent the friction between your babbitt bearings and your line shafting is robbing you in your plant?

Just as a brake-locked wheel drags a tire against a pavement and burns out its life through friction, so are babbitt bearings "dragging" against your line shafting and making unreasonable and unnecessarily expensive demands upon your power plant.

Why not let us estimate on an installation of Skayef Self-Aligning Ball Bearing hangers for your plant and demonstrate to you that it is costing *more* to keep babbitt bearing equipment than to *replace* it. Skayef Self-Aligning Ball Bearing hangers usually pay for themselves in two years or less.

For Nearest Distributor See MacRae's Blue Book

1263

SKAYEF SELF-ALIGNING BALL BEARING HANGERS

Have delivered satisfactory service throughout the world during the past fifteen years.

Their dependability and greater efficiency have long since been definitely established.

SKAYEF REEPLACE-BOXES

(Not Self-Aligning)

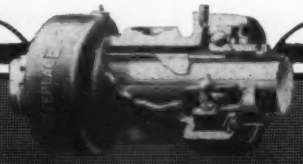
Developed to meet conditions where it may be impractical to remove present hanger frames.

Fit regular hanger frames of corresponding shaft size.

Are securely clamped to shaft.

Take care of shaft contraction and expansion.

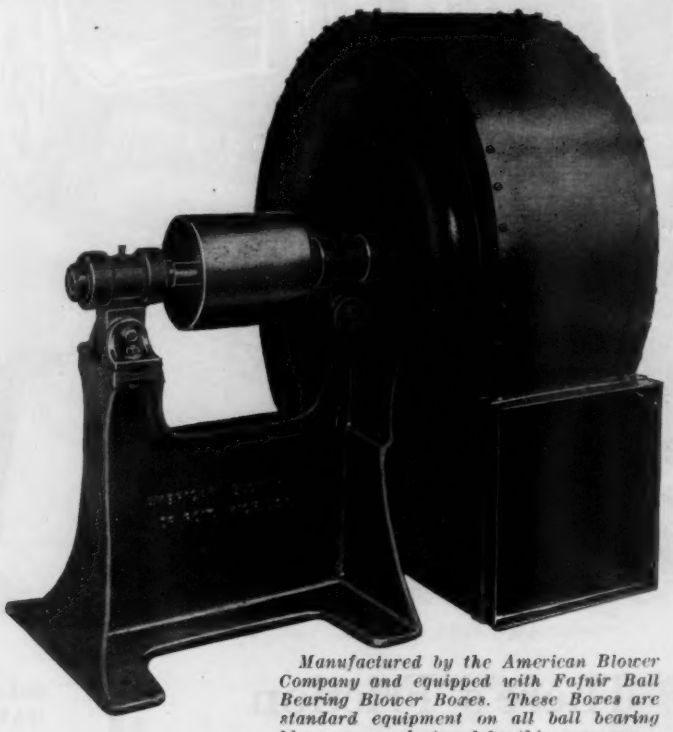
Require no adjustment.



SKAYEF
Self-Aligning Ball-Bearing
HANGERS

Made Under SKF *Supervision*

THE SKAYEF BALL BEARING COMPANY - - - - 165 Broadway, New York City



Manufactured by the American Blower Company and equipped with Fafnir Ball Bearing Blower Boxes. These Boxes are standard equipment on all ball bearing blowers manufactured by this company.

GREATER BLOWER EFFICIENCY WITH BETTER BLOWER BOXES

The transportation of cotton in its crude state from bale breaker thru picker is largely dependent on the current of air made by your blowers and fans. A failure means cessation of production.

Fafnir Blower and Fan Boxes on your blowers and fans mean the greatest efficiency in transportation. The place where a blower goes first is in the bearings; traveling at around 2500 R.P.M., exerting a terrific leverage, the fan must nevertheless be in perfect alignment. Under these conditions plain bearings have to be rebabbitted at least once a year. **Fafnir Blower Boxes** will run for years and only require oiling about every six months.

To **you** this means—less millwrights to pay, no shutdowns for wornout boxes, greater efficiency of your blowers and fans. Blowers mounted on **Fafnir Blower Boxes** are forgotten.

Ask Your Millwright About Fafnir Blower Boxes.

THE FAFNIR BEARING CO., NEW BRITAIN, CONN

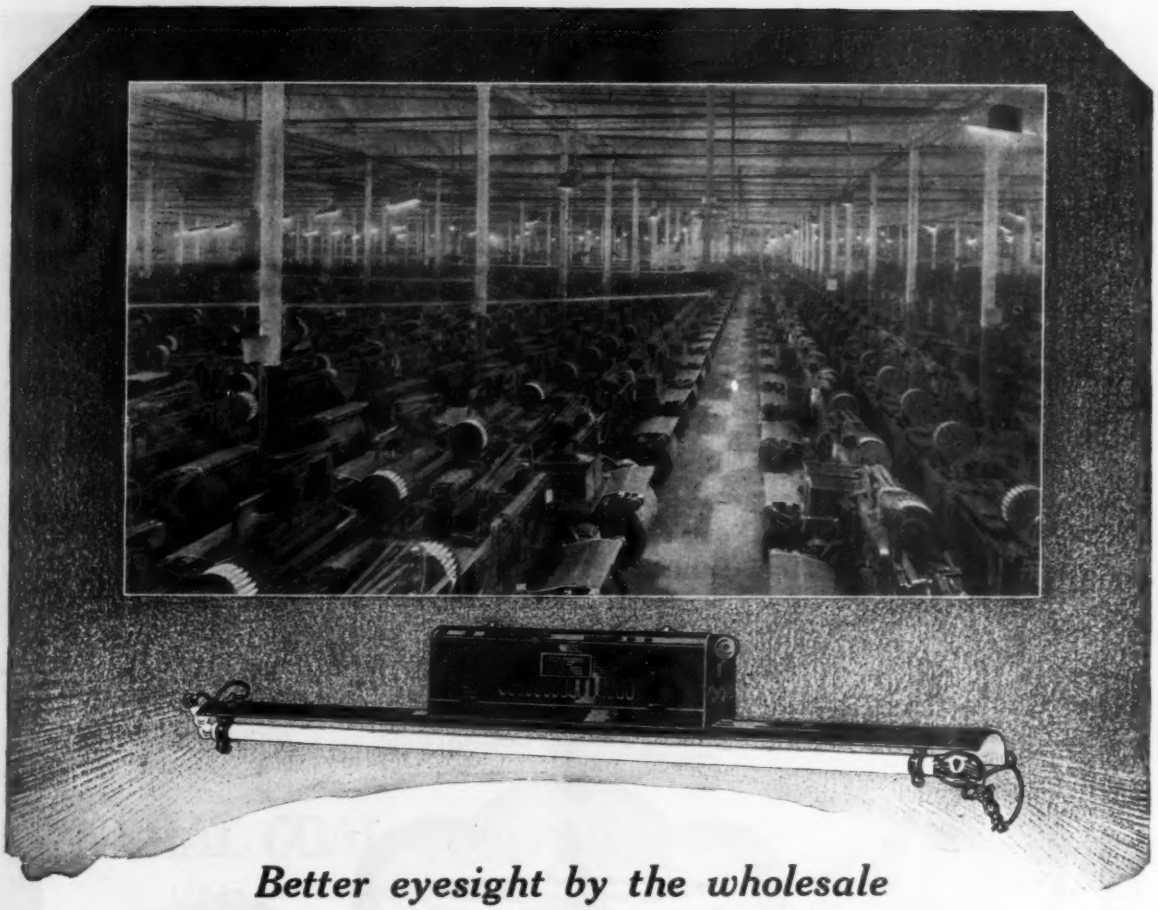
FAFNIR

BALL BEARINGS

Southern Representatives

W. S. SHIRLEY,
4237 Palmyra St., New Orleans, La.

A. G. LAUGHRIDGE
P. O. Box 1847, Atlanta, Ga.



Better eyesight by the wholesale

Picture shows automatic looms in the plant of the Industrial Cotton Mills Co., Rock Hill, S. C., photographed at night under Work-Light. The mill has a Work-Light Installation of 189 lamps.

IF you heard tomorrow that every workman in your plant was going to have a new pair of glasses fitted to his eyes, you'd think that that was a mighty fine idea. Not entirely a selfish thought, either, although your plant would get the benefit of the improvement made in the total number of eyes.

But it won't happen that way, short of a miracle or some super-salesmanship on your own part. Workmen, as a class, know no more about their eyes than you know about your own. Not one man in a thousand knows how or why his eyes are affected by light.

Any real improvement in the work-light of your men will have to come from your end of the shop. Some day it will come, and you will quite likely do it with Cooper Hewitt Work-Light, knowing that it has bettered the seeing ability of hundreds of thousands of workers in plants of all sizes and kinds.

The different, peculiar qualities of Cooper Hewitt Work-Light first bring better eyesight—then, as time goes on, better eyes. The improvement in production begins as soon as Work-Light is turned on.

The explanation is logical, easy to comprehend, not too scientific. The Work-Light book tells it all. Write for your copy today. Cooper Hewitt Electric Co., 89 River Street, Hoboken, N. J.

COOPER HEWITT

Work-Light

48 © C. H. E. Co., 1924

"America's Best since 1862"

LUNKENHEIMER

Bronze Gate Valves

This extensive line offers a type and size to meet any requirement. It thereby enables standardization on "LUNKENHEIMER" wherever Bronze Gate Valves are required, with the resultant advantages derived from that high degree of efficiency, unequalled economy of maintenance and long satisfactory service which all Lunkenheimer Products afford.

Write for booklet 574

THE LUNKENHEIMER CO.
"QUALITY"
LARGEST MANUFACTURERS OF HIGH GRADE ENGINEERING SPECIALTIES IN THE WORLD
NEW YORK CHICAGO CINCINNATI, U.S.A. BOSTON LONDON
EXPORT DEPT. 128-135 LAFAYETTE ST., NEW YORK

11012-13-10

YOU PAY—
BUT WHAT DO YOU GET?

Every time a carload of that black stuff called coal is delivered to your plant it must be paid for—but do you know just what you *get* in exchange for your perfectly good coin of the realm?

It takes only a few surplus pounds of rock or dirt to make those tons of fuel a purchase so extravagant that few firms could afford it. Thus coal users who "shop around" for cut-price fuels are always the ones who complain of high production costs!

General Coal Company is prepared to show you exactly what you will get in return for your money, and will contract with you to provide what fuel you want—when you want it—at a stable price throughout the year.

Ask the nearest office for full particulars.

Admiralty Coal · STONEGA · RODA · DEPENDABLE COAL

GENERAL COAL COMPANY

1727 Land Title Building

BUNKER COAL

Supplied at

Baltimore, Md.
Charleston, S. C.
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PHILADELPHIA

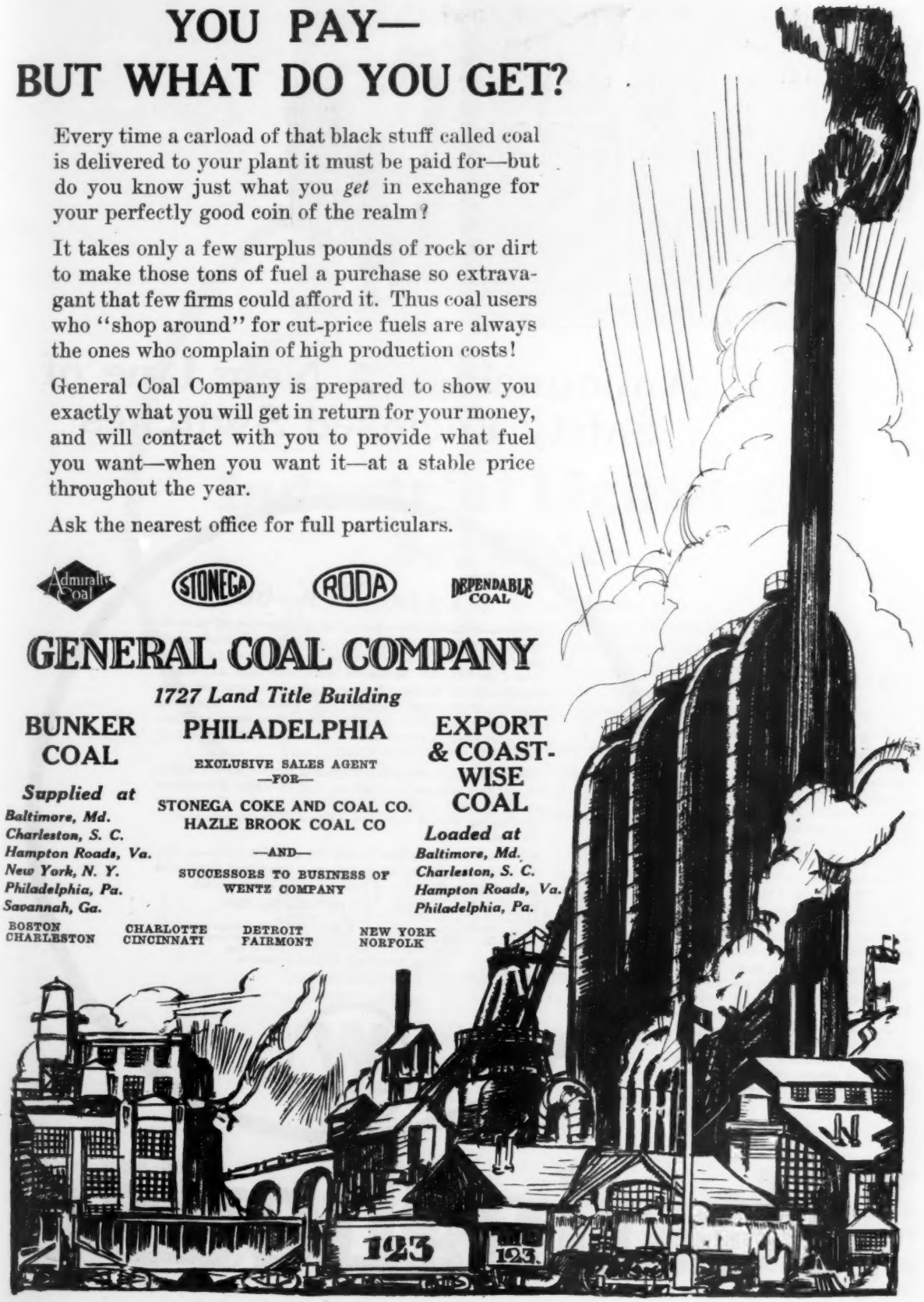
EXCLUSIVE SALES AGENT
—FOR—
STONEGA COKE AND COAL CO.
HAZLE BROOK COAL CO
—AND—
SUCCESSORS TO BUSINESS OF
WENTZ COMPANY

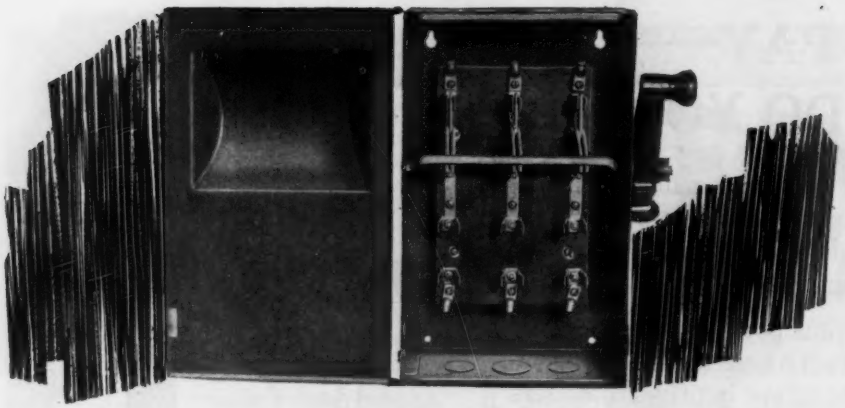
EXPORT & COAST-WISE COAL

Loaded at

Baltimore, Md.
Charleston, S. C.
Hampton Roads, Va.
Philadelphia, Pa.

BOSTON CHARLESTON CHARLOTTE CINCINNATI DETROIT FAIRMONT NEW YORK NORFOLK





Announcing—A New Line of Safety Enclosed Switches

A Few WK-60 Features

Sturdy construction throughout.

Switch jaws and blades so designed that in disrupting the arc, no current-carrying surface is burned.

No cross bar is used—switch blades are actuated from the crank shaft individually, permitting independent alignment.

Simplicity of operating mechanism.

The mechanism itself is so designed that when opening or closing it has a cushion effect with an ultimate limit of travel—a big reduction of wear and tear on blades and jaws, since no blocks or stops are used.

Operating mechanism easily removable without disturbing switch; and parts subject to wear easily replaceable.

Entire operating mechanism contained in handle outside of box, thus avoiding possibility of loose parts coming in contact with live parts of the switch.

Type WK-60

Insistent demands from industrial engineers in all parts of the country for a moderately-priced safety industrial switch have resulted in the development and perfection of the new Tyye WK-60. It has no equal in its class, anywhere, combining as it does, highest quality construction with superior mechanical features and economy. Operating tests under conditions far more severe than these switches will encounter in actual service prove that this line is now perfected.

The quick-make and quick-break mechanism is very unique in that it is extremely simple as well as highly dependable and is entirely contained in the switch handle. This entire mechanism can be removed without disturbing any other parts of the switch.

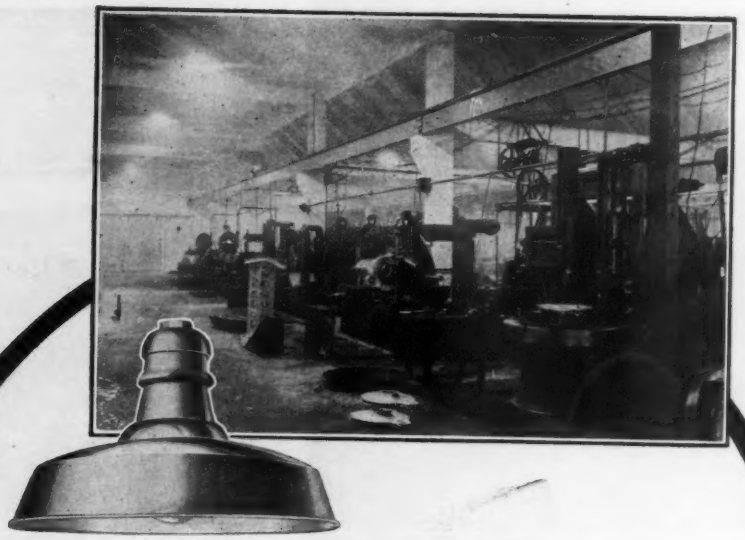
Furnished in 2-, 3- and 4-pole, 250 and 500 volts—in 30-, 60-, 100- and 200-ampere capacity. Examined, listed and labeled under direction of Underwriters' Laboratories.

Full details on request. Ask for folder No. 4604.

Westinghouse Electric & Manufacturing Company
East Pittsburgh Pennsylvania
Sales Offices in All Principal Cities of the
United States and Foreign Countries

WESTINGHOUSE ELECTRIC

Westinghouse



Industrial Lighting Service

EFFECTIVE industrial lighting planned and installed by Westinghouse brings greater efficiency of plant operation wherever used. This Westinghouse system increases production at normal labor cost; decreases accidents and spoilage; lessens labor turnover by providing clean and satisfying working conditions.

The lighting equipment developed by our Illuminating Engineering Bureau is an acknowledged standard. The ever-increasing number of industrial plants adopting this equipment emphasizes this recognition.

Every Westinghouse installation is under the supervision of the company's Illuminating Engineering Bureau. The specific lighting requirements are investigated and the resulting installation always meets the particular needs.

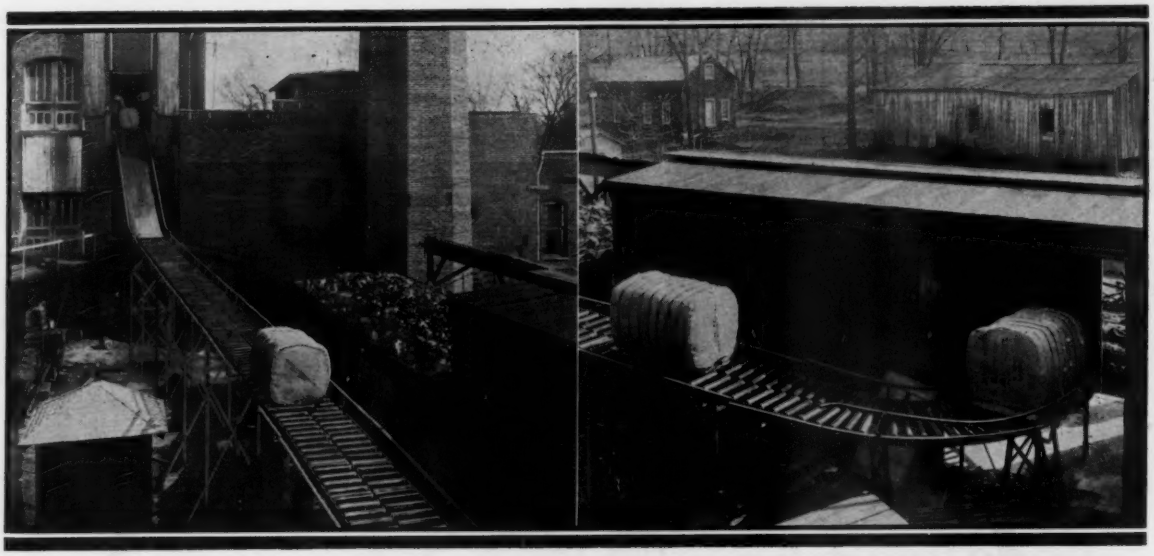
Let this Bureau help you to secure the most effective industrial lighting.

Write today to the nearest Westinghouse office.

Westinghouse Electric & Manufacturing Company
East Pittsburgh Pennsylvania
Sales Offices in All Principal Cities of
the United States and Foreign Countries

W WESTINGHOUSE ELECTRIC

Westinghouse



Does the work *Flow* through Your Plant?

THE one best way to secure a steady flow of production is to carry the materials through on a Conveyer System engineered for your particular needs.

The men best qualified to lay out such a system, by virtue of training and experience, are those in the Mathews organization. With hundreds of successful installations as a background, these men can survey your proposition and tell you what you need in the way of a conveyer system, and what it will do for you.

Every Mathews System is an individual job of engineering. Gravity and power, roller, belt, pallet, automatic elevator—it may include any or all of these, but Mathews always aims to make the fullest possible use of gravity. This keeps the maintenance cost down and explains in part why Mathews Systems pay for themselves in such an incredibly short time.

Textile mills contain many of Mathews' most successful installations, such as that of the Cherry Cotton Mills pictured here. A Mathews Engineer in your district can tell you more about these if you are interested. Our new folder, A "CLEAR BLOCK" FOR PRODUCTION, will be sent on request.

Mathews Conveyer Company

(Formerly Mathews Gravity Carrier Co.)

162 TENTH ST., ELLWOOD CITY, PA.

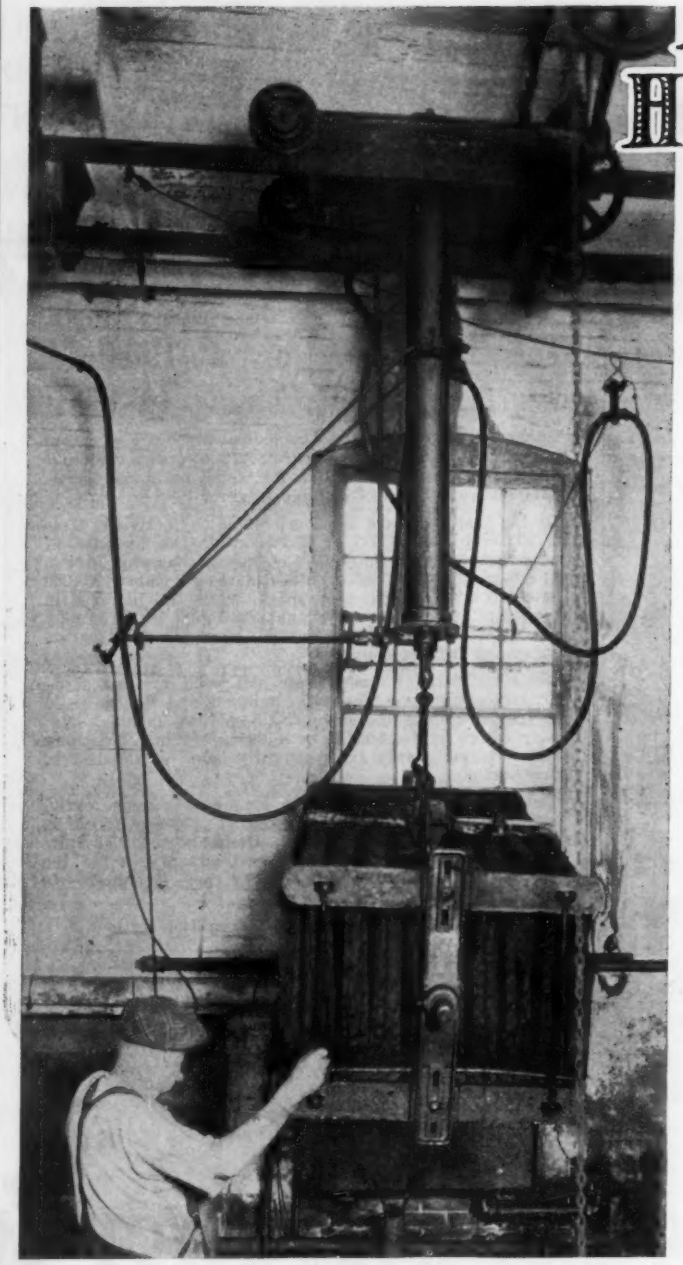
Canadian Factory: Port Hope, Ont.

MATHEWS

Conveyer Systems

CURTIS

AIR HOISTS



Used in The Textile Industry

Curtis one man All Steel Air Hoists and Curtis Roller Bearing Trolleys are effecting important economies in leading textile mills throughout the country.

Why not install a Curtis Air Hoist and operate it with the air you now have available? The wide variety of uses to which Curtis equipment can be most economically applied is worthy of your immediate investigation.

Curtis Pneumatic Machinery Company

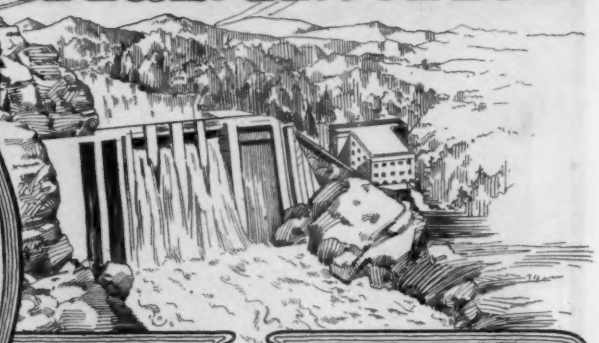
1571 Kienlin Ave., St. Louis, Mo.

Branch Office

532-R Hudson Terminal, New York

CURTIS
AIR COMPRESSORS-HOISTS-TROLLEYS-CRANES
ST. LOUIS
Established 1854

Tennessee—The Heart of Industrial America



The Prediction of a Hundred Years Ago Now Coming to Pass

Years ago they said that the logical place for a cotton mill was in the South where cotton was grown and that eventually the textile mill center would be in the South. That prediction is now coming to pass.

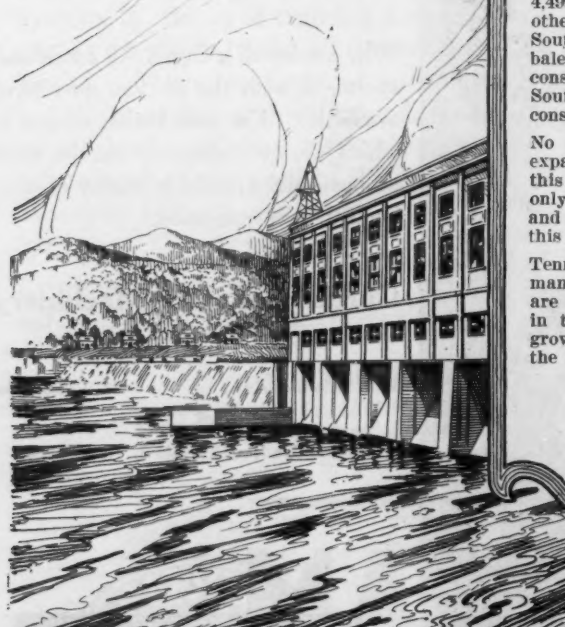
In the last 24 years Southern spindles increased from 4,495,038 to 15,871,805 or 253%, while the increase in other sections was only 23%. During the same period, Southern consumption of cotton increased from 1,479,006 bales to 4,248,525 bales or 187%, while the increase in consumption in other sections was only 11%. Today Southern mills are consuming 66.7% of the total cotton consumed in this country.

No other large industry has had such a remarkable expansion as have the textile mills of the South. And this expansion is increasing by leaps and bounds. Not only cotton mills, but large knitting, dyeing, bleaching and finishing plants are constantly being established in this section.

Tennessee is taking its place among the great textile manufacturing states of the country. Already 150 mills are prospering in this section. Probably no other state in the Union offers as many real advantages for the growth of the textile industry as does Tennessee—in the heart of industrial America.

For full information about this section write—

THE
TENNESSEE ELECTRIC POWER
COMPANY
CHATTANOOGA, TENN.



The Tennessee Electric Power Co.

Humidifier Price REDUCTION

This was our problem : — THE NECESSARY OUTPUT TO REDUCE OUR COST THUS MAKING POSSIBLE A LOWER PRICE TO THE CUSTOMER.

WE HAVE SOLVED THIS PROBLEM, thereby following the old economic law — LOWER THE COST AND YOU AUTOMATICALLY DEVELOP AND BROADEN THE MARKET.

There will be no cheapening of product or skimping of equipment. Our same STANDARD QUALITY will be maintained, but the PRICE WILL BE LOWER for orders placed FOR DELIVERY BEFORE JULY 1st, 1925.

THIS NEW BASIS OF PRICE for STANDARD HUMIDIFIER EQUIPMENT will in our opinion lead to its adoption in many plants which recognize its benefits but have delayed installation because of the cost.

AN EARLY DECISION will give you the DOUBLE BENEFIT of LOW COST and such equipment as may BEST fulfill your requirements.

AMERICAN MOISTENING COMPANY

FRANK B. COMINS, *General Manager*

Office and Factory, 251 Causeway St.

CHARLOTTE, N. C. Boston, Mass. ATLANTA, GA.

Since 1888 reliable humidifying devices.

Save half the labor in your spooling and warping department and you will reduce the cost per pound of your yarn an appreciable amount.

A most important added advantage in using our Automatic Spoolers and High Speed Warpers is the better Warps they produce, resulting in better weaving and increased production.

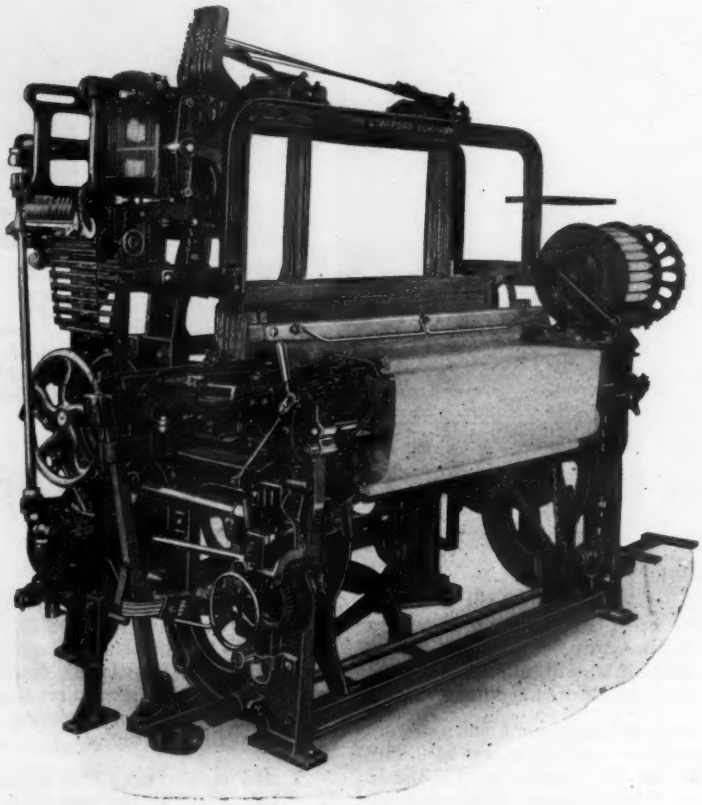
"Every Knot a Weaver's Knot"

BARBER-COLMAN COMPANY

ROCKFORD, ILL.
U. S. A.

BOSTON, MASS. GREENVILLE, S. C.

STAFFORD
LOOMS



THERE is no better time than the present to make that investment in new looms.

Prepare now to take advantage of the good business that is to come.

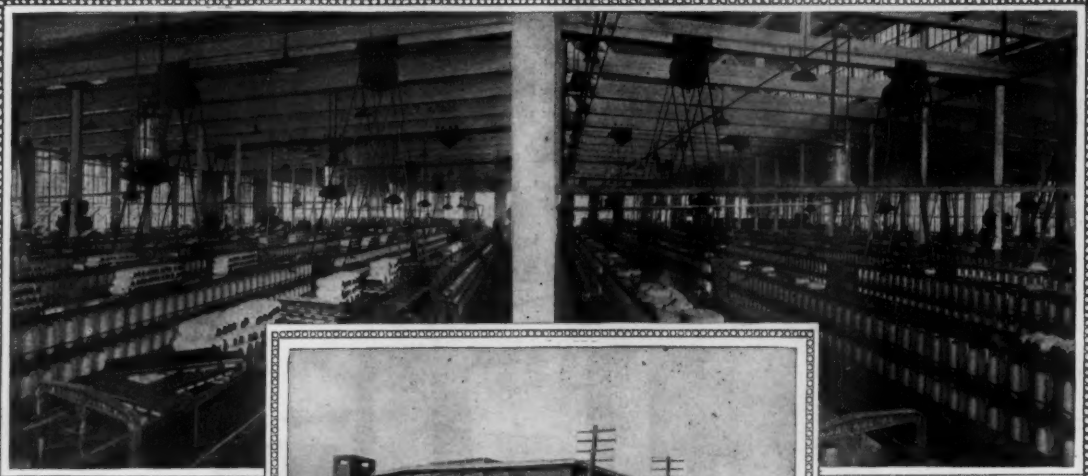
Our facilities are at your disposal now and at all times.

THE STAFFORD COMPANY

Weaving Machinery

READVILLE, MASS.

Southern Agent—Fred H. White, Charlotte, N. C.
Canadian Representatives—
Whitehead, Emmans, Ltd., Montreal, Canada.
Paterson Office—179 Ellison St., Paterson, N. J.



A. M. SMYRE MFG. CO.
Ranlo (Gastonia,) N. C.
Fine Combed Yarns
26,000 Ring Spindles

J. Lee Robinson, Pres.
A. M. Smyre, Vice Pres.
Fred L. Smyre, Treas.
Marshall Dilling, Supt.

What One Man Thinks of ParkSpray Equipment and Service

"As we now have our Mill No. 2 in operation, I feel that I should write you regarding the equipment you have furnished for both our plants and the service received from this equipment.

"The original equipment was a system of Humidifiers installed in our Mill No. 1 by Mr. S. W. Cramer in 1918. In 1920 the Parks-Cramer Company installed Automatic Regulators on this equipment.

"When we planned our Mill No. 2, we contracted with you to equip it with Humidifiers and Automatic Regulators and for the Heating System which was to be connected with our Plant No. 1. Since that time we have had you to equip a Conditioning Room.

"All of this equipment has given us the best of service and as we get such good results out of the Humidifier System, we do not think it would be possible for us to do without such an equipment. The Automatic Regulators control this System so well that it requires very little attention to keep it in operation and to get the maximum results.

"I also wish to take this opportunity to thank you for the splendid service that you render from time to time by your Service Department in seeing that our equipment is kept in the best condition possible. This service means much to us and we appreciate you rendering it in such a satisfactory way."

Yours very truly,

Marshall Dilling
Supt.

Parks-Cramer Company
Engineers & Contractors
Industrial Piping and Air Conditioning
Fitchburg Boston Charlotte

Right Regain

TEXPRO Roving Bobbins

HERE is a Roving Bobbin designed and constructed to produce better results and to effect economies in operation.

TEXPRO Bobbins are made of Cast Pulp and are but half the weight of wooden bobbins, yet they possess great strength and rigidity. They cannot split, crack or warp and they will withstand a vast amount of rough usage and abuse.

TEXPRO Cast Pulp Roving Bobbins are specially processed in a manner which makes them impervious to atmospheric conditions and at the same time adding strength and durability.

Note the Ferrule: It is made of metal and assembled to the Cast Pulp form. It can not come loose and it engages readily to the driving pin. The use of this Ferrule means lasting strength to the bobbin. The lugs at the base will not break because of hard usage, accidental dropping or other abuse.

This metal Ferrule, as you will see by the illustration, extends up inside the base of the bobbin and thus withstands the great wear that unprotected other type bobbins are subjected to at this point.

TEXPRO Cast Pulp Roving Bobbins mean more efficient operation, freedom from many bobbin troubles and longer bobbin service. They are made to fit all standard frames.

Send for sample TEXPRO Cast Pulp Roving Bobbin. Examine it carefully, put it to work. You will at once recognize its many superior qualities.

Mfd. Under Drake Patents.

THE TEXTILE PRODUCTS CO.
HARTFORD, CONN.

Patents Pending

TEXPRO BOBBINS
—cost less and last longer

TEXPRO cast pulp **BOBBINS**

Shambow Shuttles

Cost Less Than Ordinary Shuttles

When you figure the cost of a shuttle, you base your figuring on what it will do in the loom.

How much does a **"Smash"** cost you?

How much does a stopped loom cost you per minute?

How much does a poor tip cost in the warp snips it causes?

How many yards of seconds do you produce?

A shuttle that contributes to these manufacturing costs is not cheap

No Matter What Price the Shuttle-Maker Quotes!

Shambow Quality is Obtainable Only in Shambow Shuttles

SHAMBOW SHUTTLE COMPANY

FACTORIES

WOONSOCKET, R.I.
John C. Shambow, Pres.

GREENVILLE, S. C.
H. H. Ulman, V. P. & G. M.

Don't Buy "OVERHEAD"

BUYING a pavement for a factory driveway or for those inside uses where wear is especially heavy is a proposition in many respects exactly parallel to buying a factory building. *It is nearsighted economy to specify anything which will demand continual expenditures for upkeep.*

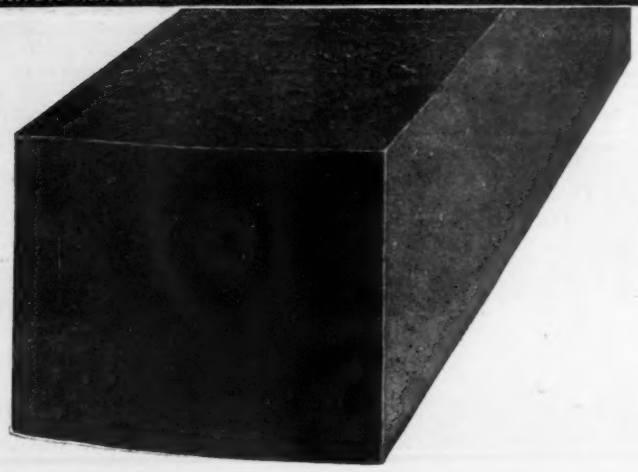
Pave with *vitrified paving brick* in and around a factory and first cost will be virtually last cost—you won't find yourself confronted by a yearly drain of dollars for repairs. Your maintenance bill will be determined almost wholly by the quality of the foundation below the brick surface. *No vitrified brick pavement ever wore out from the top down.* And it costs no more to build a foundation for brick than for any less enduring material. It should cost less.

Exact specifications for any specific indoor or outdoor use will be gladly furnished on request Simply state your problem in a letter and mail to us.

VITRIFIED Brick PAVEMENTS

OUTLAST THE BONDS

NATIONAL PAVING BRICK MANUFACTURERS ASSOCIATION, ENGINEERS BLDG., CLEVELAND, OHIO



Alton Brick Company
Alton, Ill.
Binghamton Brick Company
Binghamton, N. Y.
Cleveland Brick & Clay Company
Cleveland, Ohio
Clydesdale Brick & Stone Co.
Pittsburgh, Pa.
Coffeyville Vitrified Brick & Tile Co.
Coffeyville, Kans.
Collinwood Shale Brick Company
Cleveland, Ohio
Francis Vitric Brick Company
Boynton, Okla.
Georgia Vitrified Brick & Clay Co.
Augusta, Ga.
Globe Brick Company
East Liverpool, Ohio
Hisylvania Coal Co.
Columbus, Ohio
Hocking Valley Brick Company
Columbus, Ohio
Independence Paving Brick Co.
Independence, Kans.
Metropolis Paving Brick Co.
Pittsburg, Kans.
Metropolitan Paving Brick Co.
Canton, Ohio
Mineral Wells Paving Brick Co.
Mineral Wells, Texas

Moberly Paving Brick Company
Moberly, Mo.
Murphysboro Paving Brick Co.
Murphysboro, Ill.
Nelsonville Brick Co.
Nelsonville, Ohio
Peebles Paving Brick Company
Portsmouth, Ohio
Purington Paving Brick Company
Galesburg, Ill.
Southern Clay Mfg. Company
Chattanooga, Tenn.
Springfield Paving Brick Company
Springfield, Ill.
Sterling Brick Company
Olean, N. Y.
Streator Clay Mfg. Company
Streator, Ill.
Thurber Brick Company
Ft. Worth, Texas
Toronto Fire Clay Company
Toronto, Ohio
Trinidad Brick & Tile Company
Trinidad, Colo.
Veedersburg Paver Company
Veedersburg, Ind.
Western Shale Products Company
Fort Scott, Kans.
Westport Paving Brick Company
Baltimore, Md.

Left, Ellis St., one of busy thoroughfares touching Peachtree at Winecoff Hotel corner: Sheet Asphalt on slag binder course. Sam E. Finley, Contractor, Atlanta.

Above, one of seventeen Slag Concrete streets laid 1921-22 by Jamison & Hallowell (Atlanta); this picture was taken at Inman Circle, one of Atlanta's most attractive residential sections.

Basic Slag lends "the strength of steel" to these city pavements in Atlanta

"ENSLEY" & "ALA CITY"
BASIC SLAG
CRUSHED & SCREENED

In large cities nowadays—when the automotive traffic is heavy and almost continuous—the use of Portland Cement Concrete requires a "coarse aggregate" of proved bonding strength.

The increasing use of our scientifically prepared Basic Slag in Concrete pavements—in Atlanta, Birmingham and other population centers—is due to the fact that slag is tough, angular and porous. The cement penetrates every pore and becomes an inseparable part of the concrete.

The bond is perfect, everlasting.

On this page are shown examples of three modern types of street paving into which our Basic Slag has lent "the strength of steel."

Atlanta has tested Slag in nearly two hundred thousand square yards of Concrete streets. And now she is using it with uniformly good results in Sheet Asphalt and Asphaltic Concrete.

A list of these projects, with complete data will be promptly furnished executives of textile mills in the Southeastern states served by the

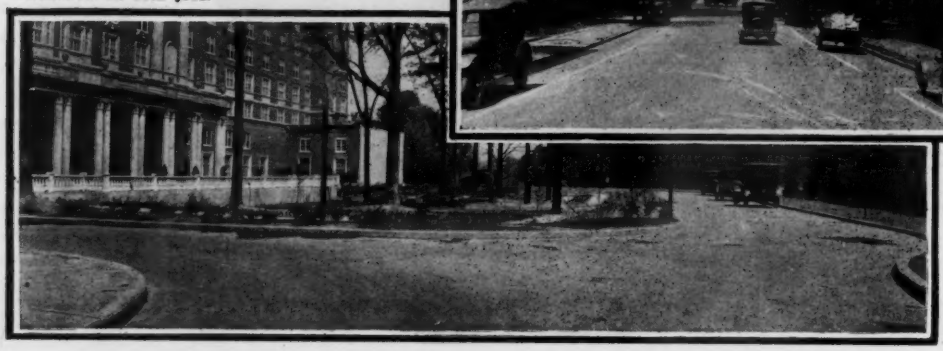
Birmingham Slag Co.

Slag Headquarters for the South

ATLANTA BIRMINGHAM MONTGOMERY
THOMASVILLE ORLANDO

Right, East Harris St.—Paved with Asphaltic Slag Concrete—1½ inch Slag binder and 1½ inch Asphaltic Slag Concrete wearing surface on old granite block foundation.

Lower photo shows Sheet Asphalt paving at entrance of imposing Atlanta Biltmore Hotel (reinforced Slag Concrete throughout) 1½ inch Slag binder course; Sheet Asphalt wearing surface on Slag Concrete base. Sam E. Finley (Atlanta), contractor on both jobs.



The Profit in Building With Foresight

A large manufacturing company in the middle west maintains a standing committee whose duty it is to plan years ahead for the physical growth of the plant. The result is that each new building fits into a well-thought-out plan. The plant has grown to several times its original size, but hardly a single building has had to be scrapped. Intelligent foresight has reduced expensive changes to a minimum.

Lockwood, Greene & Co. stand in the same relation to their clients as that committee. They study the needs of a client's business with the same zeal. They read the signs of future requirements with even greater acumen because of their greater experience. They keep closely in touch with a client and his business and are ready at any time to work out far-sighted plans for expansion.

Experience has shown us that many mills are laboring under excessive investment charges or adverse manufacturing conditions. The trouble in most cases is a wrong type of building, a layout which blocks proper expansion, or the necessity of demolishing good structure to make needed extensions. Frequently we find a mill built with no appreciation of the limitations that are imposed permanently by lack of foresight.

"Building with Foresight" is a business principle advanced by Lockwood, Greene & Co. through many years of industrial engineering. A booklet bearing that title and containing descriptions of plants we have designed will be sent to you on request.

LOCKWOOD, GREENE & CO.
ENGINEERS

EXECUTIVE OFFICE, 24 Federal Street, BOSTON, MASS.

BOSTON NEW YORK CHICAGO
DETROIT ATLANTA CLEVELAND CHARLOTTE SPARTANBURG

Lockwood, Greene & Co. of Canada, Limited, Montreal.

The "Yarn Saver"

TAKING the waste out of winding is one of the functions of "Sonoco" Cones and Tubes.

"Uniform packages; true wound without waste; with even tension in every yard wound; and smooth delivery without breakage:"—these are the claims made for yarns when wound on "Sonoco" Cones.

The Sonoco Company concentrates its efforts on maintaining accuracy, balance and unvarying uniformity in its cones with a strict attention to detail that has undoubtedly contributed to the success of this company.

The Sonoco Products Company, successor to the Southern Novelty Company, is also one of the clients served by this organization of Engineers.

A new and revised edition of "Factories for the Future" discusses many important factors of industrial construction, equipment and production.

You may be interested also in "Picks to the Minute" on the Textile Industry, and "Contentment Under Roof" on maintaining industrial harmony. Write for them.

J. E. SIRRINE & COMPANY
Engineers
Greenville **South Carolina**

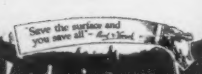
Buy Christmas Seals and help Fight Tuberculosis.

TRADE OJACO MARK

MILL WHITE

A product of smoother, firmer texture, which--- when properly applied ---seldom shows brush marks.
Of Enduring Whiteness ---Pleasing to the Eyes

OLIVER JOHNSON & CO.
INCORPORATED
Makers of Paints
for all Industrial Purposes
18-24 Custom House Street
Providence, R. I.



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Live Leather
Where the Pull is Hard

It's the lasting resiliency of correctly prepared "live" leather, not obtainable in other material, that makes this oldest power transmission medium the most popular where pull is long and the drive hard.

Cocheco Belting is cut from the backbone center of carefully selected packer steer hide butts; it is oak tanned and curried by a special process that gives firm and pliable stock; it is carefully stretched, stripped and matched by experts; it is as dependable, as durable, as serviceable as leather belting can be made.

Made to meet each driving need where the best leather belting is desired. The Cocheco Belting Booklet tells all about it.

I. B. WILLLIAMS & SONS

DOVER, NEW HAMPSHIRE, U. S. A.

14-16 N. Franklin St. Chicago, Ill.

71-73 Murray St. New York, N. Y.

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If you
have a
store room
that
looks
like this

Give the Bowser Engineers a chance and they will make it look like this!

BOWSER ESTABLISHED 1885

S.F. BOWSER & COMPANY, Inc.

Dependable Pumps and Tanks

FORT WAYNE, INDIANA, U.S.A.

Sales and Service Representatives All Over The World

Genuine BALDWIN Chains and Sprockets

BACKGROUND

The Baldwin Organization is as old as the Roller Chain Industry. Baldwin introduced Roller Chain over a quarter of a century ago—so the history of Baldwin is the history of Roller Chain. By Roller Chain is meant machine finished steel roller chain as differentiated from the various types of chain of crude construction, either malleable or steel, but only partially machine finished.

The ends of Baldwin pins are shouldered and knurled, and afterwards forced into the link holes by power. This forms the closest possible metal to metal fit because the pin is larger in diameter than the holes in the links. This insures against rotation of pin in the link. It prevents undue stretching of the chain.

Rollers case hardened. A flint hard surface to resist wear and tough core to resist shock, accomplished by a special process of heat treating.

Pins of Alloy Steel, case hardened and afterwards ground to exact size. The Baldwin process of case hardening, while making the surface flint hard, to resist wear, keeps the core tough to resist shock.

Bushings hardened and afterwards ground to exact size—a press fit in the inside links.

Side Plates are of high tensile strength Cold Rolled Steel.

With the pin and bushing locked in the outer and inner links respectively, wear is evenly distributed over the entire length of pin and bushing.

Baldwin Chains and Sprockets are built *up to a standard* and never *down to a price.*

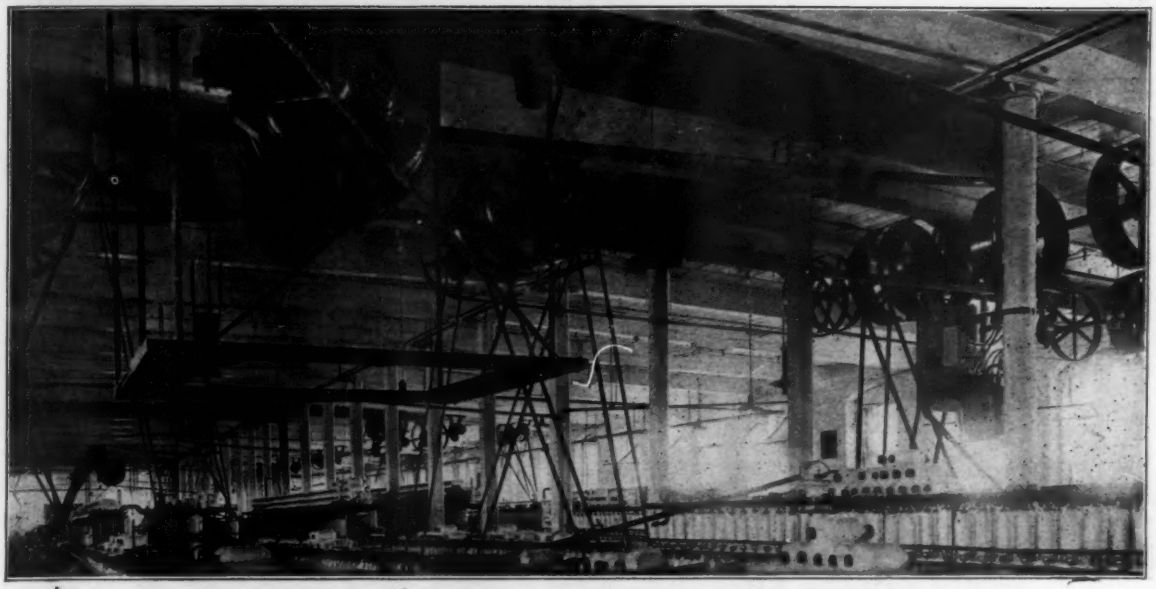
THE BALDWIN LINE

Steel Roller Chain
Steel Block Chain
Steel Replacement Series
"Quiet Running" High Speed Chain
Accurate Cut Sprockets
SPECIAL Chains with Conveying Attachments

Baldwin Chain & Mfg. Co.

Worcester, Mass., U. S. A.

N. H. Eckman, General Southern Sales Representative,
404 McGlawn-Bowen Bldg., Atlanta, Ga.



Less Rejections

1. *Group drive* on spinning frames and looms gives even yarn speeds and uniform goods. Group drives average 6¼ times fewer breakdowns per year than individual drives in one big modern plant.

2. Good *leather belts* have a longer life than any substitute. Leather belts turn out more work at less cost than substitutes—you don't have to run them so tight that they burn up bearings—and money.

Read this:

Robert W. Drake, electrical engineer of the McCormick International Harvester Plant, has written a pamphlet on "When to Use Group and Individual Drives". He knows drives and belts—he has used nearly every kind of tool—*his pamphlet is practical.*

Tests which it has taken years to work out are at your fingertips for the asking.

LEATHER BELTING EXCHANGE
Philadelphia, Pa.

Nothing takes the place of

LEATHER

Use this Coupon today
—it has put money in other pockets—get yours.

15

Address LEATHER BELTING EXCHANGE
417 Forrest Building, Philadelphia, Pa.
Please send me a free copy of "When to Use Group and Individual Drives" by Robert W. Drake, electrical engineer of the McCormick International Harvester Plant.

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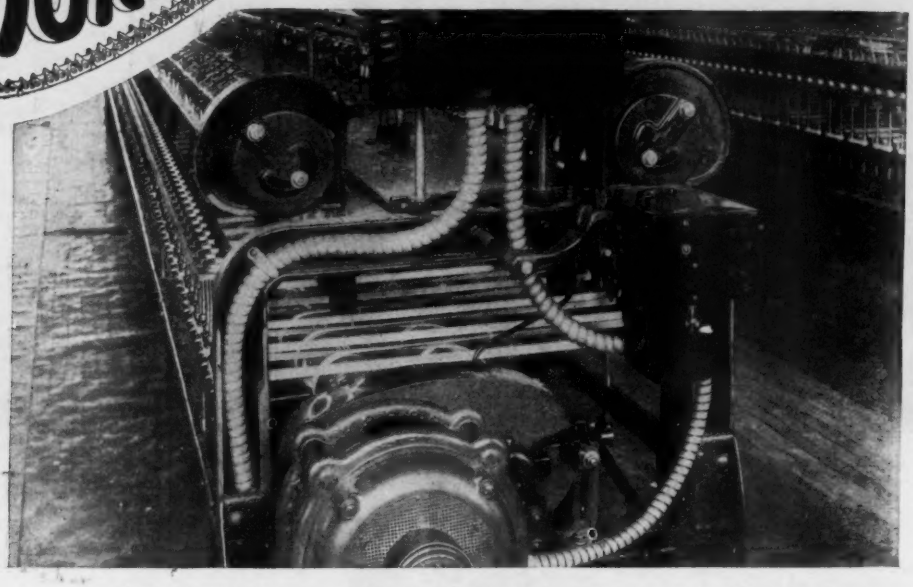
MORSE SILENT CHAIN DRIVES



Morse Silent Chain, enclosed in case, driving from motor to spinning frame.

Securing Maximum Convenience of Operation

The use of individual Morse Silent Chain drive on spinning frames is today fully appreciated by textile mills everywhere. It is preferred to two-frame and four-frame drive, since it gives better speed regulation, eliminates belt slipping, and thus increases production materially.

An accepted arrangement is to mount an 1800 R.P.M. motor on a bracket supplied by the machine builder, and to transmit the power to the cylinder shaft by means of a Morse Chain Drive.

Morse Chains can be depended on with confidence. They continuously transmit 98.6%, by actual test, of the power developed by the motor. They cannot slip, may be run on long or short centers as desired, run slack and therefore without excessive journal friction, do not obstruct light or collect dust, and permit the most convenient arrangement of machinery.

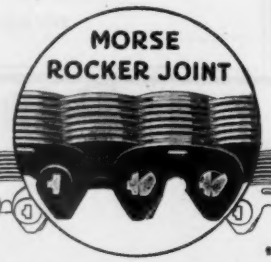
More teeth are in working contact and carry their proportionate share of the load than with spur gears. The result is smoother action, less wear, long life, no vibration or noise.

Let the Morse Engineers cooperate with you in planning the kind of power drives that give you the satisfaction you demand.

MORSE CHAIN CO., ITHACA, N. Y.

There's a Morse Engineer near you.

Atlanta, Ga......702 Candler B'dg., Earl F. Scott & Co.
Baltimore Md......1402 Lexington Bldg.
Boston, Mass......141 Milk St.
Charlotte, N. C......404 Commercial Bank Bldg.
Chicago, Ill......Room 803, 112 W. Adams St.
Cleveland, Ohio.....421 Engineers Bldg.
Denver, Colo......211 Ideal Bldg.
Detroit, Mich......7601 Central Ave.
New York City.....Room 1871, 50 Church St.
Minneapolis, Minn......413 Third St., Strong-Scott Mfg. Co.
Philadelphia, Pa......Room 803 Peoples Bank Bldg.
Pittsburgh, Pa......Westinghouse Bldg.
San Francisco, Cal......Monadnock Bldg.
St. Louis, Mo.,..Railway Exchange Bldg., Morse Chain Co.
Toronto, Ont., Can......Strong-Scott Mfg. o.
Winnipeg, Man., Can.—Duffer n Stree:. Strong-Scott M'g. Co.



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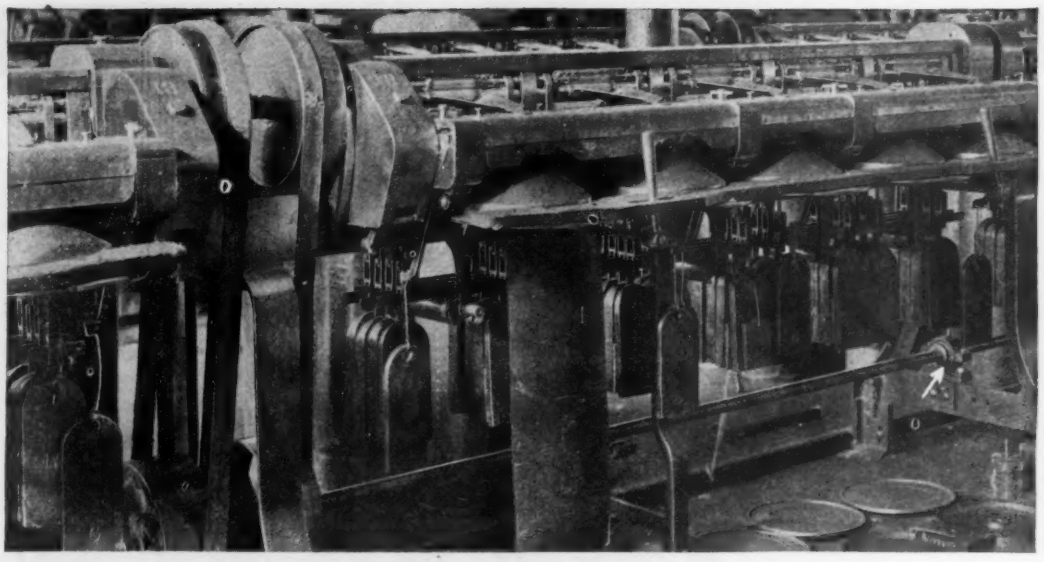


Lightened Load and Lessened Wear on Main Drive Shaft of Drawing Frame

DUE to the short drive on a drawing frame it takes a tight belt to keep the rolls up to speed when mounted on sliding bearings. This tight belt puts all the load on the caps of the boxes in which the drive shaft is mounted, the shaft being pulled away from the bottom of these boxes so that all oil runs out very quickly. This leads to rapid wear and frequent replacement.

A drive shaft mounted on Strom Ball Bearings runs lighter, gives no trouble, and requires lubricant only once in three or four months. The boxes never wear and let the belts get slack. A tight belt causes no more friction load than a slack one, and belts can be kept as tight as desired.

Boxes and bearings for applying to old frames can be supplied by the Aldrich Machine Works, Greenwood, S. C.

Double-acting thrust bearing, flat seats (grooved races) 2100-F Series

Single-acting thrust bearing, flat seats (grooved races) 1100-F Series

Single-acting, self-aligning thrust bearing 1100 Series

Single-acting, self-aligning thrust bearing, leveling washer, 1100-U Series

Double-acting, self-aligning thrust bearing, leveling washers 2100-U Series

Single-row deep-groove Standard type, radial bearing

Double-row, deep-groove Standard type, radial bearing

Angular contact bearing, combination radial and thrust

Double-row, maximum type, radial bearing

Single-row, maximum type, radial bearing

Strom BALL BEARINGS

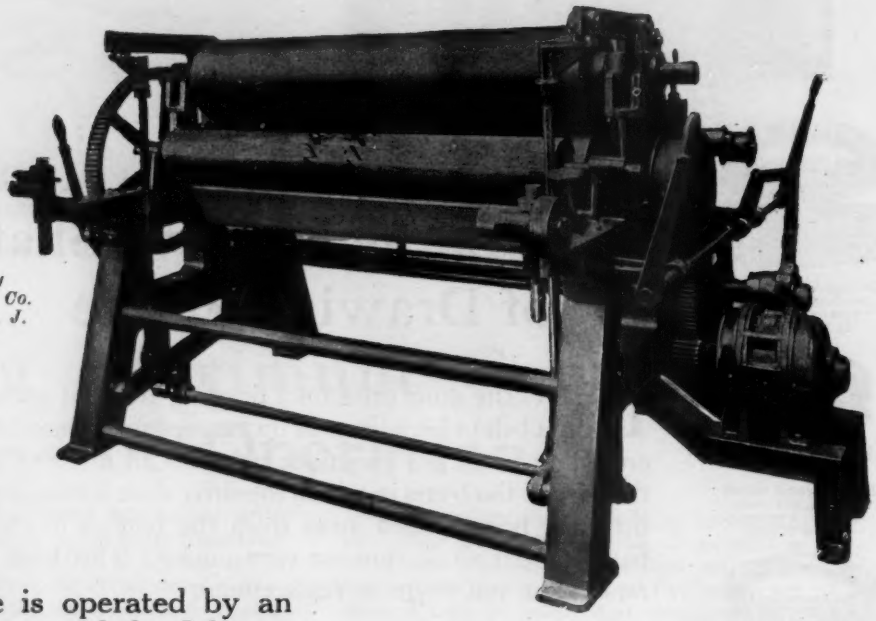
STROM BALL BEARING MFG. CO.

Formerly U. S. Ball Bearing Mfg. Co.

4544 Palmer Street, Chicago, Ill.

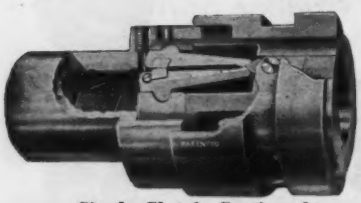
THE JOHNSON FRICTION CLUTCH

—as used on the Werner Two-Roll Heavy Squeezer for piece goods—



Courtesy Werner & Co. Passaic, N. J.

This machine is operated by an individual motor and the Johnson Clutch is used to quickly stop and start it. The clutch can be operated more quickly and easily than a motor can be stopped or started.



Single Clutch, Sectioned

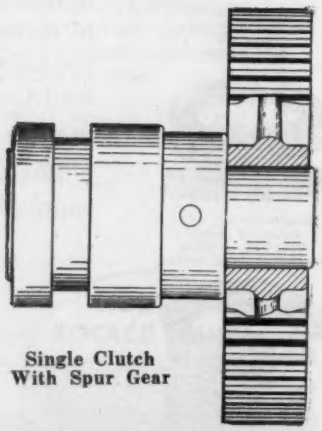
Spur gears, sprockets or pulleys are easily mounted with our clutches.

The Johnson Clutch is a means to better machinery.

Better machinery means greater production.

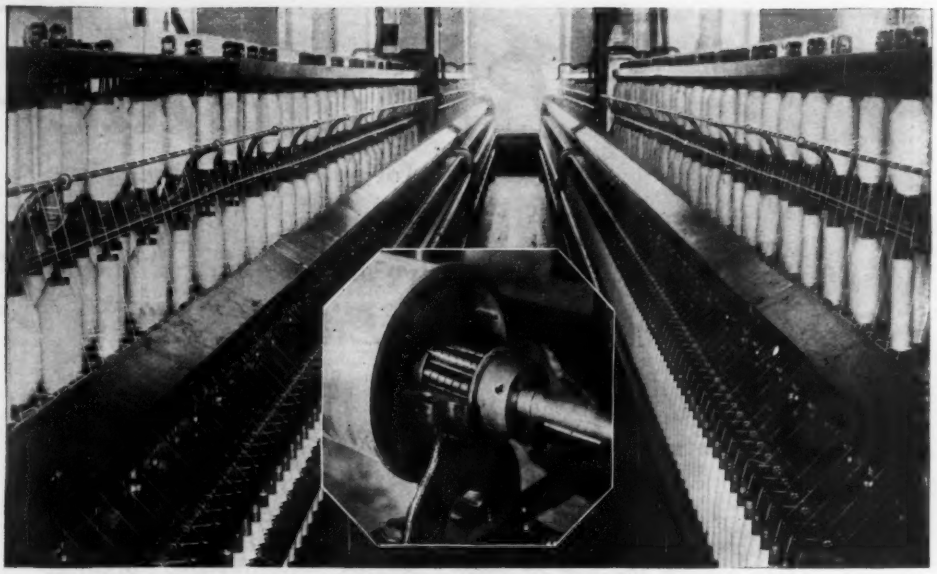
A saving combination.

Write for Catalog "G"



Single Clutch With Spur Gear

THE CARLYLE JOHNSON MACHINE CO. MANCHESTER CONN.



Some of the 60 Hyatt equipped spinning frames at the King Philip Mills, Fall River, Mass. Insert shows method of applying Hyatt bearings to these frames.

The Investment Value Of Hyatt Equipped Spinning Frames

REPEATED mill tests have proved that Hyatt roller bearings on cylinder shafts of spinning frames save an average of ½ H.P. per frame. From authoritative sources we learn that the average cost per H.P. per year is $30.00.

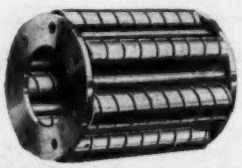
Thus the annual saving to users of Hyatt equipped frames is $15.00 per frame and the return on the investment is:

$$\frac{\$15.00 \text{ (annual saving)}}{35.00 \text{ (cost of bearings)}} = 43\%$$

However, power saving is only one of the advantages derived from Hyatt bearings. By eliminating plain bearing friction and providing strength at the bearing points they yield substantial maintenance economies and reliable operation.

Insist that your spinning frames and other machinery be equipped with Hyatt bearings.

Have you received a copy of the new 50 page illustrated Hyatt Textile Bulletin? We shall be glad to send you one.



HYATT ROLLER BEARING COMPANY

NEWARK DETROIT CHICAGO SAN FRANCISCO
WORCESTER PHILADELPHIA PITTSBURGH
CLEVELAND MILWAUKEE

HYATT ROLLER BEARINGS FOR TEXTILE MACHINERY

If It's A Broadside—

If it is an especially large illustration for an especially large piece of literature, chart, birds eye view, map, etc. Whether it be in one or more colors, our plant is equipped to supply your needs. No halftone or line plate too large or too small for our equipment.

Illustrating Your Literature

Sometimes in the preparation of your sales and advertising plans you find the need of some especially prepared piece of literature, the execution of which will baffle your photographer, electrotyper and printer. Frequently you may seek a service that the ordinary plant cannot give.

Our plant is designed and equipped for the accomplishment of many difficult products that cannot be secured from most photo-engraving establishments; is equipped to furnish the best of photo-engraving, electrotyping, printing, nickeltyping, commercial art and allied service, whether large or small, whether one or more colors. The extent of our equipment is reflected in the large process camera, which can furnish you with process color plates as large as a yard square. One of the 6 largest in the world. If you have an idea you wish carried into execution, we are at your service. We will gladly perfect it and illustrate it.

Battery of Cameras in the Photo-Engraving Department

A Close Up View of One of the 6 Largest Color Process Photo-engraving Cameras in the World—Installed in the Photo-engraving Dept. of Jacobs & Co.

Jacobs & Company
Clinton, S. C.

Advertising, Commercial Art
Photo-Engraving—Electrotyping
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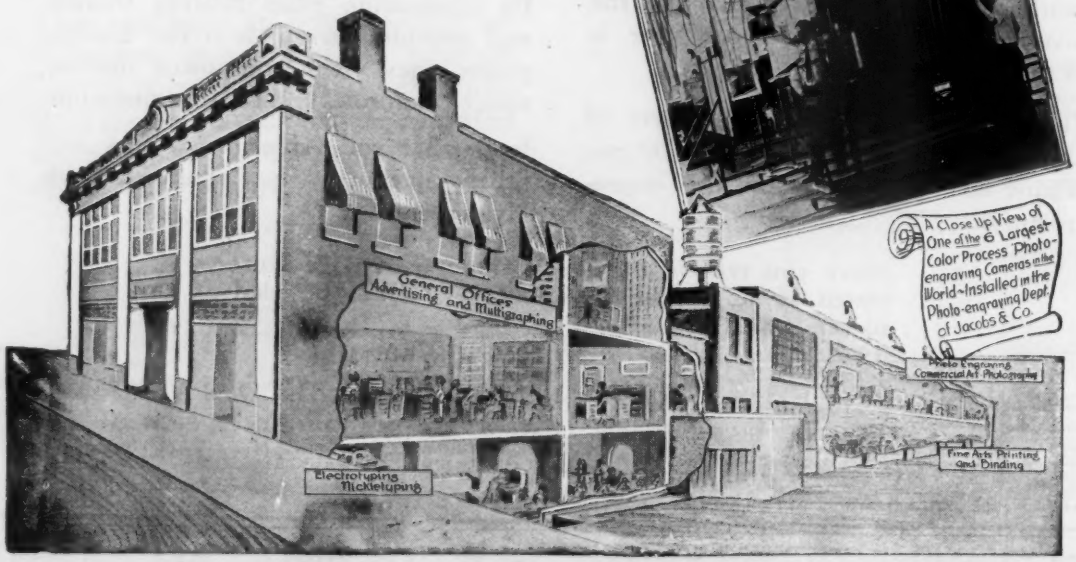

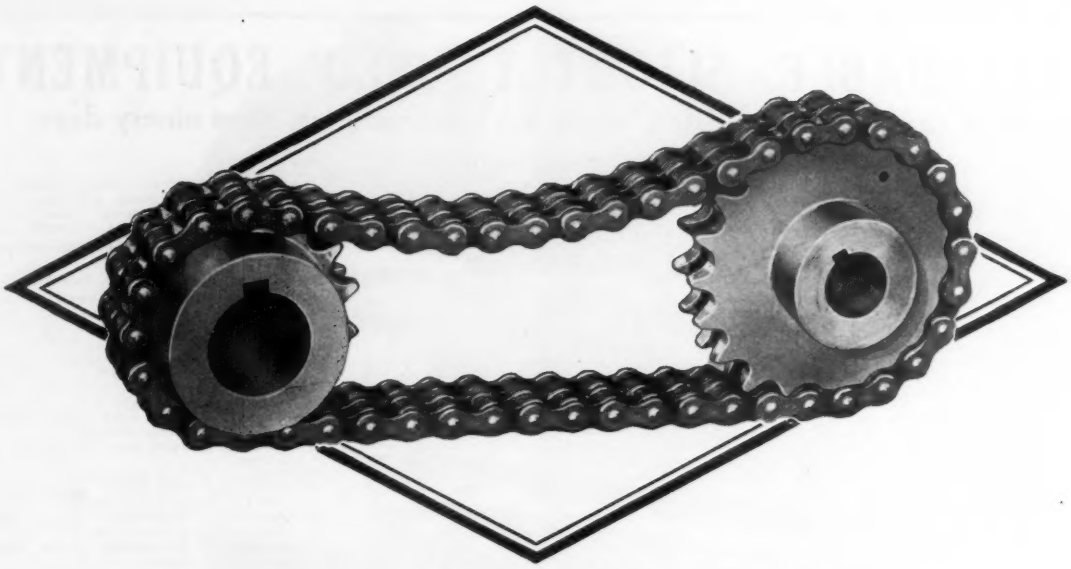

High Speed Roller Chains

For Motor Drives in Your Mill

THE decided advantages offered by DIAMOND High Speed Roller Chains for motor drives account for their increasing use in all industries.

Ten of the outstanding advantages are—

1—Consistent efficiency as high as 98% to 99%.
2—Flexibility, durability and dependability.
3—Quietness and smoothness of action.
4—Simplicity of construction and operation.
5—Compactness.
6—Low first cost.
7—Low installation cost.
8—Low maintenance cost.
9—Ease of repair.
10—Reduction of power costs.

Wherever the proper DIAMOND Roller Chains are used on motor drives, these economies and advantages may be obtained. Send us your specifications and our engineers will recommend a DIAMOND Roller Chain Drive suitable for your conditions. Catalog and data sheets sent on request.

DIAMOND CHAIN & MFG. CO. Indianapolis, U.S.A.

Makers of High Grade TRADE MARK *Chains Since 1890*

DIAMOND Roller Chains

DEPENDABLE, SLIGHTLY USED EQUIPMENT

Most of the Equipment listed below has been used less than ninety days

12—823 h.p. Babcock & Wilcox Stirling water tube boilers. 200 lbs. pressure, Class M-30. Complete with Westinghouse stokers, forced draft fans, Vulcan soot blowers, and all accessories.

2—300 h.p. Heine boilers, 150 lbs. pressure. Murphy stokers and accessories.

2—500 h.p. Keeler boilers. Wetzel stokers and accessories.

2—42 x 11½ x 50 Birdsboro Hydro Pneumatic Accumulators. Designed for 300 lbs. air service. Equipped with Watson-Stillman Automatic Regulator.

4—15 and 26 x 20 x 24 Compound Duplex Laidlaw Compressors. Pressure 60 lbs. Capacity 2,570 cu. ft. at 150 r.pm.

1—160" Buffalo Steel Plate Induced Draft Fan, three-quarter housing, designed to work against 1¾" static pressure at 450° F. Left hand type, over hung blast wheel, water cooled bearings.

2—120" Buffalo Steel Plate Induced Draft fans, three-quarter housing, designed to work against 1¾" static pressure at 450° F. Equipped with wedge adjusting water cooled bearings.

15—No. 24 six section 8' Sargent cotton dryers.

15—48" Sargent Mixing Pickers.

1—110' Link-Belt fixed radius crane, 5½ yd. bucket.

5000—12" and 18" car wheels with 36" gauge axles and Hyatt roller bearings.

1—Otis freight elevator, 3,000 lbs. Capacity, 31' travel, car 11'7" x 7'11" and 12'9" under beam. Otis engine and motor.

1—Otis freight elevator, 6,000 lbs. capacity, 36'2" travel, platform 10' x 10'2". Otis engine and motor.

2—36" x 54" x 96" American Kinyoun-Francis Steam and Formaldehyde disinfectors, radial arm door at each end, vacuum type formaldehyde ammonia generator.

125—Motors, ¼ to 150 h.p.. 2 phase, 60 cycle. Write for Bulletin No. 21.

45—Transformers, Single phase, 60 cycle, 10 to 600 KVA.

4—35 KW. Burke motor generator sets.

1—40 KW. Sprague belt-drive generator set.

1—30 KW. Crocker-Wheeler belt-drive generator set. Our Bulletin No. 21, Electrical Equipment, covers a large stock of motors, transformers, conduits, panels, switches, receptacles, switching devices, lightning arresters, oil circuit breakers—all new or practically new equipment.

100—Platform scales, 10, 60 and 100 ton capacities, for truck, tank, and track. Write for Bulletin No. 20, Scales.

1—General Electric MG-3 500 ampere Arc Welding Set. Complete and ready for operation. Mounted on two 36" gauge cars.

5000—Double-deck steel bunks. 30" wide.

1—4" Landis pipe machine.

12—Kellog Hammer Welded Steel Autoclaves, 300 lbs. working pressure. Recommended for use in the manufacture of Diphenylamine, Dimenthyanilline, Para Amidophenol, Anisidine, Phenetidine, Phenacetine, Alpha-Naphthol, Amido-Naphthol Sulfonic Acids, H-Acid, Gamma Acid, Beta-Naphthylamine and its sulfonic acids, and many others.

1—18" Iron Type Sperry filter press. Used but in good condition.

2—Special 7,000 lb. nitrators, consisting of steel tank, stirring apparatus and coils.

1000—Tons Duriron pipe and fittings.

20—6000 lb. Catenary Type Nitric Acid Retorts.

POWER PLANT EQUIPMENT

10—Connersville 26" x 36" horizontal top discharge gas blowers, capacity 24.5 cu. ft. per rev. at 4.58 lbs. per sq. in. at 255 r.p.m. Mounted on cast iron bed plate with double outboard bearing. Pulley 16" x 72".

8—24" Buffalo Electric disc fans with single phase motors.

8—30" Buffalo Electric disc fans with single phase motors.

2—No. 3 Root High Pressure Style D Blowers, top discharge, with displacement of 2⅝ cu. ft. per revolution, single geared with double outboard bearings on bed plates, 30" x 8" driving pulleys. Max. pressure 10 lbs. per sq. in.

4—Allis-Chalmers 18" x 36" 350 h.p. Corliss Engines. Heavy duty mill type, Double eccentric. Crown face fly wheel 11 ft. diameter by 32 in. face. Complete with Richardson-Phenix oil filtration and lubricating system. Left hand type only available.

2—No. 30 Schutte & Koerting Multi Jet condensers. Steam inlet 38". Water inlet and outlet 14". Equipped with 4" Vacuum breaker. Designed to produce 24" mercury when condensing 33,000 lbs. of steam per hour with 3,000 g.p.m. condensing water at 92° F. at 9 lbs. pressure at condenser jets.

1—No. 5 Allis-Chalmers vertical jet condenser.

1—Ross surface condenser, size 200.

8—Patterson-Allen closed water heaters. Capacity 30,000,000 B.T.U. per hour or 470 gallons per minute. Size 44" diameter x 10'2" long.

4—Patterson-Allen closed water heaters. Capacity 8,000,000 B.T.U. per hour, or 126 gallons per minute. Size 24" diameter x 8'6° long.

3—Warren Webster open type, 11,000 B.H.P. feed water heaters.

3—Cochrane 8" extra heavy live steam separators.

1—Cochrane 24" oil separator.

10—Swartwout Hydromatic steam traps, size 1½ in., pressure 30 lbs.

250—Swartwout Hydromatic steam traps, size ½ in., pressure 150 lbs.

10—Swartwout Hydromatic steam traps, size 1 in., pressure 100 lbs.

COTTON DRYING APPARATUS

15—Special Sargent cotton washers or rinsers.

15—Sargent 48" Model "M" feeders for Sargent dryers.

6—Noble and Wood concentrators, 44" diameter, 42" length.

GENERAL EQUIPMENT

1—8" Landis pipe machine. Equipped with 6" to 8" head.

2—2" Landis pipe machines.

1—1½" Landis single head pipe and nipple machine. Equipped with set No. 3 dies.

1—No. 9½ Eaton, Cole & Burnham pipe machine. Cuts 2½" to 4".

1—Murchey roller cutter, cuts 1" to 2".

1—Murchey roller cutter, cuts 2½" to 4".

1—No. 22 J. W. Paxson cupola.

2—Monarch Steel Harvey Furnaces No. 60, tilting, stationary, portable.

1—Rahn-Larmon 22"-30" x 14' Series B lathe.

1—32" x 14' Pittsburgh heavy pattern double back geared engine lathe.

1—Atkins Saw-Kwick Kut No. 7, with ½ h.p. motor.

1—36" x 28" x 10' Cincinnati planer.

1—No. 17 Bartlett Greenard Arbor press, 25 ton capacity, 36" between housings.

1—16" Smith & Mills single gear shaper.

1—5' Fosdick radial drill.

1—3' American radial drill.

1—16" x 6' American high duty lathe.

1—14" x 6' Hendy lathe.

1—Wisconsin Universal grinder No. 181.

1—125 lb. Belt-driven power Fairbanks hammer.

1—Royersford No. 3 double end punch and shear.

6—Sloan & Chase No. 5½ bench lathes.

2—No. 16 Moline table type rail feed multiple drills.

1—No. 6 Morgan nailing machine.

1—No. 8 Morgan nailing machine.

16—No. 21 Hartford improved surface grinders.

1—C. C. Hare's Four Leaf cornice brake No. 685.

2—No. 2 Oliver Universal wood trimmers.

1—250 lb. Chambersburg steam hammer.

1—Fay & Egan No. 33 side planer.

1—24" Vance Re-Saw.

1—30" Fay & Egan double surfacer.

1—No. 211 Brandeis portable cut-off saw.

2—Fay & Egan 42" Swing cut-off saws.

1—32" Hill-Curtis gang edger.

5—2½" Type A American Centrifugal pumps.

3—3" Type C American Vertical Centrifugal pumps.

8—3" Baker Centrifugal pumps.

32—4" Baker Centrifugal pumps.

8—5" Goulds Centrifugal pumps.

16—6" Baker Centrifugal pumps.

3—3 x 2¾ x 3 Worthington Duplex pumps.

2—5½ x 4¾ x 5 Worthington Duplex pumps.

41—6 x 2½ x 6 Worthington Duplex pumps.

3—8" 3 Stage Alberger-Curtis Steam Turbine driven boiler feed pumps.

10—25 and 38 x 4½ x 24 Worthington Tandem Compound Duplex pumps.

2—10" Type S, Allis-Chalmers Centrifugal pumps with 150 h.p. motor.

5—No. 3 Douglass Diaphragm hand pumps.

9—No. 3 Humphreys Diaphragm Hand pumps.

5—3"Goulds Diaphragm Hand Pumps.

5—4" Barnes Diaphragm Hand pumps.

9—4" Domestic Diaphragm pump with 2 h.p. Gasoline Engine (on truck).

6—4" Domestic Diaphragm pump, with 1½ h.p. Gasoline Engine (on trucks).

13—4" C. H. & E. Diaphragm pump, Gasoline Engine driven (on skids).

CHEMICAL EQUIPMENT

8' inside dia., 9' inside depth. Shell 1⅛". Equipped with cover.

50—3" Centrifugal submerged acid pumps.

2—Sets, 3 wringers to a set, 36" belt-driven centrifugal wringers.

60—42" Centrifugal wringers, direct-connected to 40 h.p. vertical motors.

3—Dorr Re-Action Tanks, 10' x 10', complete with agitators and steam coils.

3—Sulphuric acid plants, complete or in part. The process employed follows the essential principles of the Grillo-Schroeder system, although it differs mechanically from the usual contact plant using that system. Conversion is accomplished by the use of platinized magnesium sulphate as a catalytic agent. Equipment includes three Glan Falls Sulphur burners, 48" dia., 20 ft. length, with standard Glen Fal s combustion chambers 7'6" in diameter and 10 ft. high. Rated burning capacity each 1,200 lbs. per hr. Also equipment such as pressure filters, spray catchers, coke filters, towers, cooling pipes, feeder-boys, chain buckets, elevators, etc.

Equipment for nitric acid plants, including Hart condensers, retorts, absorption towers, condenser tubes, retort fire box doors, grates, flues, retort cars, valves, fittings, storage tanks, duriron pipe and fittings.

Write for prices and specifications.

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Quickly Installed—
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Being split they can be installed easily and quickly without removing pulleys or other shaft equipment, and without interrupting production.

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Sturtevant Pneumatic Conveying and Collecting Systems are especially useful in cotton, wool, shoe, glass, fur and woodworking industries.

They rid the air and machinery of dust, and dirt, speed up production, maintain a clear healthy atmosphere and make working conditions better for employees.

We do not hesitate to recommend Sturtevant Conveying and Collecting Systems, in fact, we will be pleased to call at your request and show you the advantages of these systems.

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Every industrial executive has undoubtedly heard how efficiently and economically the Sturtevant Stationary Vacuum Cleaner keeps—free from dust and dirt—the floors, walls and machinery, in industrial establishments.

If you have not already installed one of these cleaners we feel sure that you will profit by asking us to call and show you its advantages.

We also recommend the Sturtevant Portable Vacuum Cleaner for use in offices, homes, shops, etc. No obligation to you in asking us to call.

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Mechanical Draft Apparatus, Turbines, Motors, Cindervanes, Economizers, Transmission Gears, Automatic Stokers.

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We recommend Sturtevant, Guaranteed, power plant equipment.

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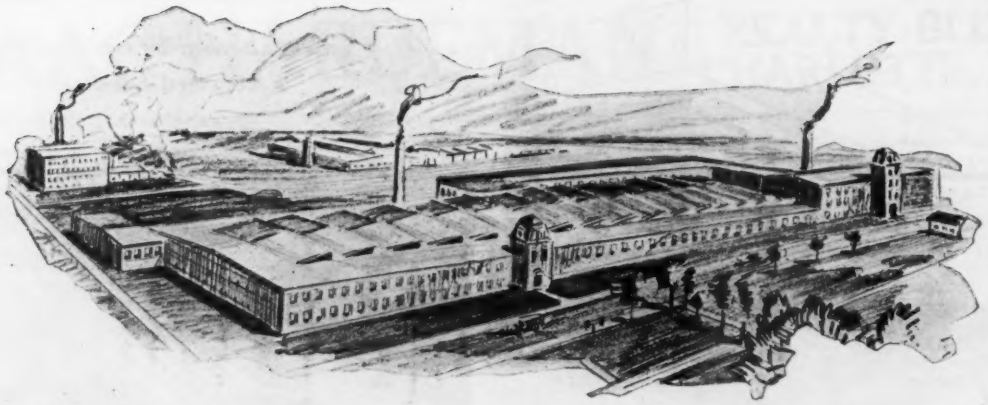

Fine Colored Fabrics of the Locke Cotton Mills, Concord, N. C., are finished on

Butterworth Machinery

Roseglen Ginghams and Locke Shirtings—mention one, and immediately you think of the other.

Both are known not only for quality, but for the fact that this quality is consistent—each piece is always like every other in a shipment, whether or not that shipment has hundreds of thousands of pieces.

In featuring the Locke Mills in this series, calling attention to Butterworth Installations in widely known plants, let us point to just one of the many Butterworth Machines in the Locke Mills.

This machine is a five-roll calender which has been in use since 1881—forty-four years—and good for years and years of service.

BUTTERWORTH

Think of the millions and millions of yards of cloth that have gone over the rolls of this calender since 1881—before Grover Cleveland went into the White House for the first time.

We are glad that this calender has played its part in the quality production Roseglen Ginghams and Locke Shirtings. We are proud of its record and the fact that it is still in such good condition.

It is performances such as this that has led persons in the textile industry to say "Butterworth Machines never wear out!"

H. W. BUTTERWORTH & SONS SO.

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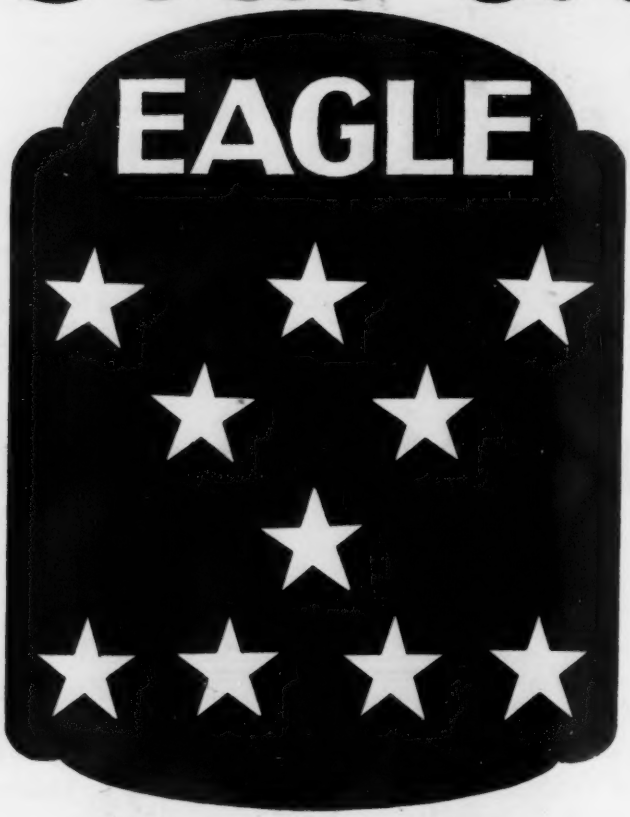

—and these stars have a meaning—

They signify the different grades in which Thin Boiling Eagle Starch is offered to the textile industry.

Being the pioneers in the manufacture of **Thin Boiling Starches** we are gratified at the widespread recognition they have received.

Be sure to select the best grade suited to your work. Our knowledge and experience are at your service.

Corn Products Refining Company

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Starch

GOOD WILL

An Advertisement by Chas. E. Carpenter

Good Will is the confidence which those who can use the Houghton Products, have that E. F. Houghton & Co. will render the proper quality, price, quantity and service, which confidence causes them to purchase regularly the Houghton Products.

Good Will is the most difficult asset to create and the easiest to destroy. For that reason the banks do not consider it a very safe asset upon which to base credit, but so long as Good Will is good, it is usually the most valuable asset a business can have.

As an illustration: in 1920 a large oil manufacturing concern, which had never specialized upon the Houghton sort of products, found itself with a large war plant on its hands and in the hope of utilizing the plant profitably, endeavored to purchase the business of E. F. Houghton & Co.

The would-be purchaser said, "We do not want to buy your plant, as we have more plant than we know what to do with; we do not need capital, for we have ample; but what we want is your Good Will and organization, for which we are willing to pay $1,000,000. The offer was declined.

Our Good Will is carried on our books at nothing, and, therefore, this was an opportunity to obtain an estimate from outside sources asto its value. Ever since that date we have considered our Good Will worth at least a million.

Just as the banks claim, that million dollar asset could be made almost valueless overnight, by some questionable action on our part.

Some folks are dishonest because they cannot resist the temptation of gain offered by dishonesty, and some folks are honest because they cannot afford to be dishonest. Some folks are dishonest because they are naturally bad, and some folks are honest because they are naturally good.

But frequently those whom we believe to be naturally good, go wrong under the pressure of temptation.

I have nothing in common with those who claim to be "More Godly than thou," for after all we only have a man's word for his claims for virtue.

What I do want to feature is that we have everything to lose and nothing to gain by resorting to questionable business practices and, therefore, it must be self-evident that there is no temptation for us to fight.

We may or may not be virtuous because it is natural for us to be so, but it is a fact that it does not pay us to be otherwise.

We believe that both the oil and leather trade will average with almost any other, in the high morals of its members; but there are some few who have not yet learned that it does not pay to be "tricky."

Therefore, we want to impress upon the reader, not our superior virtue, for that is not something of which we should boast, but the fact that we have nothing to gain by being otherwise.

Your attention is called to the fact that the HOUGHTON PRODUCTS are sold directly to the mills through our exclusive distributors and cannot be obtained from the oil jobber or supply house. Therefore, we are in a position to guarantee the purity of the products as delivered, and have under our own control, every factor in the business from the purchase of the raw materials until the finished product is delivered and invoiced to the final consumer. By this means we absolutely control our own policies.

We have no desire to reflect upon the integrity of the oil jobber or supply house. They both serve a useful purpose in the community, but we feel that the Houghton Guarantee, which is back of every sale we make, could not be consistently applied, unless we controlled the policies of our business as herein described.

E. F. HOUGHTON & COMPANY - PHILADELPHIA, PA.

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SPECIAL PRODUCTS

Hydroxy Art Silk Coning Oil—A specially prepared oil used for coning, winding, knitting and softening dyed or undyed artificial silk. It makes the silk knit easily—eliminating break-downs and reducing seconds. It washes out easily at low temperatures and therefore gives more even and brighter shades in dyeing and bleaching.

Hydroxy Wool Scouring Oil—For woolen piece goods and yarns. One part of this oil will carry into an emulsion five parts mineral or other oil used in batching and for this reason is superior to soap for woolens. It makes a clear solution and is not affected by hardness of the water; hence it will go further than soap and work better.

Hydroxy Boil-off Oil (For pure silk)—Degums piece goods and hosiery better than soap. Action is quicker, produces softer goods, and secures better results.

Hydroxy Art Silk Scouring Oil—This oil will remove from artificial silk anything from kerosene to paraffine which winders, knitters and weavers use to make the silk work easily; enabling the dyer to obtain even shades and bleach. Ordinary chemicals will not do this.

Kali Chlorine Neutralizer — Prevents tender bleached goods and makes the finished product whiter. It is a superior antichlor as it acts quicker on the chlorine, has bleaching properties of its own, does not liberate free sulphur, and does not yellow the goods.

"Developene"—Rusty black stockings finished with this turn to a lustrous black. To demonstrate its effectiveness we shall be glad to receive stockings which have been dyed black and washed, but not finished, which we will finish with "Developene." "Developene" is made only by the Kali Manufacturing Co.

Hydroxy Fat Liquor—For tanning of fine skins.

Hydroxy Finishing Oil.

Hydroxy Kier Oil—Removes oils and waxes, producing more even bleaching and dyeing.

Hydroxy Para Soap—For dyeing Para Reds.

Hydroxy Silk Soap—For degumming skein silk.

Hydroxy Textile Oil—For wetting out, dyeing, softening and finishing. The highest grade made.

Hydroxy Throwing Oil—(Soluble neatsfoot) for throwsters' use in soaking silk.

Hydroxy Benzine Soap.

Turkey Red Oil—50% and 75%.

Kali Boil Salts—For use in kier.

Olive Silk Finish—For oxidized black.

English Fulling Oil—For fulling and scouring woolens.

Kali Detergent—For all cleaning purposes.

Sulphantine—Destroys last traces of sulphide of soda.

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Hydroxy Cutting and Drawing Compound—Paste for cutting threads.

Hydroxy Screw Cutting Oil—Soluble in water.

Disfectol (Registered)—Disinfectant, germicide, antiseptic and deodorant; soluble in water.

STANDARD CHEMICALS

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Acids
Acetic Acid—Tech. 28%, 56%, 70% Carboys and barrels.
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Battery Acid
Benzoic Acid, U. S. P.
Carbolic Acid, Crystals or Crude (Phenol)
Citric Acid
Cresylic Acid—Dark
Dipping Acid, for brass workers
Etching Acid
Formic Acid
Hydrofluoric Acid—Carboys and Barrels
Lactic Acid
Muriatic Acid, Tech., and C. P. (Hydrochloric Acid)
Nitric Acid—All strengths
Oxalic Acid
Phosphoric Acid — Tech. and U. S. P.
Pickling Acid, for cleaning castings
Pyroligneous Acid
Salicylic Acid—Powdered Preservative for size
Salicylic Acid—Sublimed
Salicylic Acid—U. S. P.
Salicylic Acid—from natural oil
Sulphuric Acid—Tech. and C. P. (Oil of Vitriol)
Sulphurous Acid
Tannic Acid—Crystals for discharge and resist work
Tannic Acid—Powdered for dyeing
Tartaric Acid
Alum—All kinds
Alumina
Acetate of Alumina
Sulphate of Alumina—Ground or lump—Tech. and iron free
Chloride of Alumina
Ammonia
Aqua Ammonia—All strengths Drums and Carboys
Acetate of Ammonia
Chloride of Ammonia (Sal Ammoniac)
Oxalate of Ammonia
Barium Chloride
Bleaching Powder
Boiler Corrective (Removes and prevents scale)
Borax—Lump and Powdered
Calcium Chloride
Carbon Bisulphide
Carbon Tetrachloride
Chrome Acetate
Chlorates
Sodium Chlorate
Potassium Chlorate
Copper Sulphate (Blue Stone)
Dextrine
Epsom Salt—U. S. P. and Tech., (Magnesium Sulphate)
Extracts—Hemetine, Logwood, etc.
Formaldehyde—U. S. P., 40% by volume
Gelatine—Sheets and Ground
Glauber's Salt—Crystal and anhydrous
Glucose
Glue—Sheets, Broken and Granular
Glycerine—Tech and C. P.
Grape Sugar
Gums
Arabic
Tragacanth
Flexible Gum (for silk size)
Iron
Nitrate of Iron—By Copperas—Red Iron
Nitrate of Iron—True
Pyrolignite of Iron—Black Iron
Sulphate of Iron—Copperas
Lead Acetate (Sugar of Lead) White—Crystals and Powder Brown—Broken
Lime
Chloride of Lime—Bleach (Calcium Hypochlorite)
Oils
Cocoanut Oil
Neatsfoot Oil—Low acid test for Throwsters
Olive Oil
Castor Oil, No. 3
Castor Oil, U. S. P.
Oil of Vitriol (Full 66° Be')
Lard Oil
Lard Oil—Winter pressed
Oil of Wintergreen—Synthetic
Turkey Red Oil
Oxalate of Ammonia
Peroxide of Hydrogen
Potash
Carbonate of Potash
Caustic Potash
Bichromate of Potash
Chlorate of Potash
Soaps
Palm Oil Soap
Red Oil Soap
Olive Oil Soap
Sal Ammoniac—Ground
Soda
Acetate of Soda—Tech.
Soda Ash, 58%
Bisulphite of Soda—40°
Bisulphite of Soda—Anhydrous (Powdered)
Caustic Soda—Ground, Flakes Fused and Solution
Chlorate of Soda
Bicarbonate of Soda
Bichromate of Soda
Hydrosulphite of Soda—Anhydrous (For discharging and dyeing)
Hypochlorite of Soda (Javelle Water)
Hyposulphite of Soda
Nitrate of Soda
Phosphate of Soda
Tri Sodium Phosphate
Sal Soda—Crystals (Carbonate of Soda)
Silicate of Soda—42° Be'
Silicate of Soda—Heavy Syrup
Sulphate of Soda (Anhydrous Glauber's Salt, Dry Powder)
Sulphide of Soda—Crystals
Sulphide of Soda—Concentrated 60-64%
Sulphite of Soda
Soluble Oils—All grades
Soluble Wax
Soluble Blue (Bleacher's Blue)
Starch
Sulphonated Oils—All oils—Castor Corn, Soya-bean, Neatsfoot, Fish, Cod, etc.
Sulphur—Roll, Flour, etc.
Sulphur Dioxide—in Cylinders
Tin
Bichloride of Tin, Stannic Chloride) 50° and 55° Be'
Tin Crystals (Stannous Chloride)
Tetrachloride of Tin (Stannic Chloride—Anhydrous)
Turkey Red Oil, 50% and 75% Perfectly Soluble
Turpentine
Potash
Bichromate of Potash
Permanganate of Potash, Tech and U. S. P.
Red Prussiate of Potash (Potassium Ferricyanide)
Yellow Prussiate of Potash (Potassium Ferrocyanide)
Zinc
Zinc Chloride—Fused
Zinc Chloride—Solution 20° and 42° Be'
Zinc Dust
Zinc Sulphate—Technical

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Here is *prevention* of theft and incendiarism—not merely insurance against. Here is real security for your yard materials and plant.

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FIRM *~because anchored*

PERMANENT *~because galvanized*

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Monuments of Integrity

The hundreds of K-W Machines which we have sold to Textile Mills, have by their long years of satisfactory service, built monuments of business integrity which stand as evidence of the superiority of K-W machines.

The high quality materials used in the construction of K-W machines is the reason why they give years of economical service under the most trying conditions. Leading mills throughout the country use them because they can buy no better at any price—smaller mills use them because they are the most economical in ultimate cost.

K-W engineers will be glad to help you solve any finishing problem in your mill, without obligation. Write us today.

THE KLAUDER-WELDON DYEING MACHINE CO.

BETHAYRES, PA., U. S. A.

H. G. Mayer, Southern Agent, Johnston Bldg., Charlotte, N. C.

KLAUDER-WELDON

DYEING-BLEACHING-SCOURING-MACHINERY

For drying cotton, linters, wool, hair, flax and other classes of raw material.

SARGENT DRYERS mark progress in Dryer Development comparable to that made in other fields of mechanical endeavor.

They are favored with a natural preference because they are designed on basic principles of air circulation, conveying and general drying apparatus construction which have had the approval of discriminating mill men and drying engineers for many years. In the SARGENT DRYER these principles have been combined and refined, making a complete machine which is unexcelled.

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Fred H. White, Southern Agent, Charlotte, N. C.
R. C. Jefferson Co., Phila. Agt., Drexel Bldg., Philadelphia, Pa.

SARGENT DRYERS

REPAIR BILLS

Electric Underdriven Extractor

FLETCHER EXTRACTORS SAVE YOU THIS EXPENSE

Not only the money involved but also time,—both highly important factors in the profitable operation of your plant.

With the installation of FLETCHER EXTRACTORS, you have the assurance of utmost efficiency, coupled with the absence of annoying and expensive delays.

Long ago FLETCHER EXTRACTORS proved their individual and exclusive advantages and today are recognized standard equipment.

You are invited to write us concerning your individual requirements.

FLETCHER WORKS

Incorporated
(Formerly Schaum & Uhlinger)
Glenwood Avenue at Second Street
Philadelphia, U. S. A.

Sales and Service in Boston, Chicago, Charlotte, N. C., Atlanta, Ga., Portland, Ore., Los Angeles and San Francisco.

An Airplane View of the Home of Douglas Starch, Cedar Rapids, Iowa.

DOUGLAS CROWN STARCH

A THIN boiling starch made especially for the textile trade—produced in the most modern and perfectly controlled starch plant in America.

Over 20 years of study and experience in the production of textile starch and its uses enable us to manufacture the most perfect textile starch.

Douglas Starch is available in all special and standard grades—

DOUGLAS CROWN STARCH
(A refined thin boiling starch)
DOUGLAS PEARL STARCH
DOUGLAS POWDERED STARCH
DOUGLAS WARP SIZING STARCH
DOUGLAS LION MILL STARCH

Our representative will promptly supply samples and full information. Write to

PENICK & FORD SALES CO., Inc.

Manufacturers of Corn Products
CEDAR RAPIDS. IOWA

NEW ORLEANS, LA. MONTGOMERY, ALA. NEW YORK, N.Y.

Southern Representatives
G. L. MORRISON, Greenville, S. C.
J. H. ALMAND, Atlanta, Ga.

New England Representatives
MARBLE-NYE COMPANY
Boston and Worcester, Mass.

DURABLE K-W UNIVERSALLY USED

"The World's Best Dyeing, Bleaching and Scouring Machinery."

Monuments of Integrity

The hundreds of K-W Machines which we have sold to Textile Mills, have by their long years of satisfactory service, built monuments of business integrity which stand as evidence of the superiority of K-W machines.

The high quality materials used in the construction of K-W machines is the reason why they give years of economical service under the most trying conditions. Leading mills throughout the country use them because they can buy no better at any price—smaller mills use them because they are the most economical in ultimate cost.

K-W engineers will be glad to help you solve any finishing problem in your mill, without obligation. Write us today.

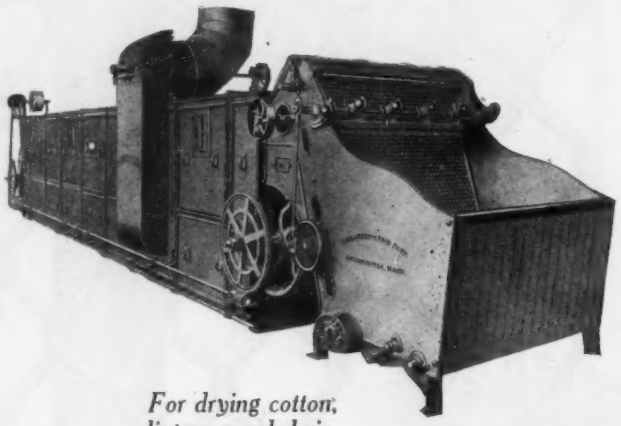
THE KLAUDER-WELDON DYEING MACHINE CO.

BETHAYRES, PA., U. S. A.

H. G. Mayer, Southern Agent, Johnston Bldg., Charlotte, N. C.

KLAUDER-WELDON

DYEING-BLEACHING-SCOURING-MACHINERY



For drying cotton, linters, wool, hair, flax and other classes of raw material.

SARGENT DRYERS mark progress in Dryer Development comparable to that made in other fields of mechanical endeavor.

They are favored with a natural preference because they are designed on basic principles of air circulation, conveying and general drying apparatus construction which have had the approval of discriminating mill men and drying engineers for many years. In the SARGENT DRYER these principles have been combined and refined, making a complete machine which is unexcelled.

C. G. SARGENT'S SONS CORPORATION, GRANITEVILLE, MASS.

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R. C. Jefferson Co., Phila. Agt., Drexel Bldg., Philadelphia, Pa.

SARGENT DRYERS

REPAIR BILLS

Electric Underdriven Extractor

FLETCHER EXTRACTORS SAVE YOU THIS EXPENSE

Not only the money involved but also time,—both highly important factors in the profitable operation of your plant.

With the installation of FLETCHER EXTRACTORS, you have the assurance of utmost efficiency, coupled with the absence of annoying and expensive delays.

Long ago FLETCHER EXTRACTORS proved their individual and exclusive advantages and today are recognized standard equipment.

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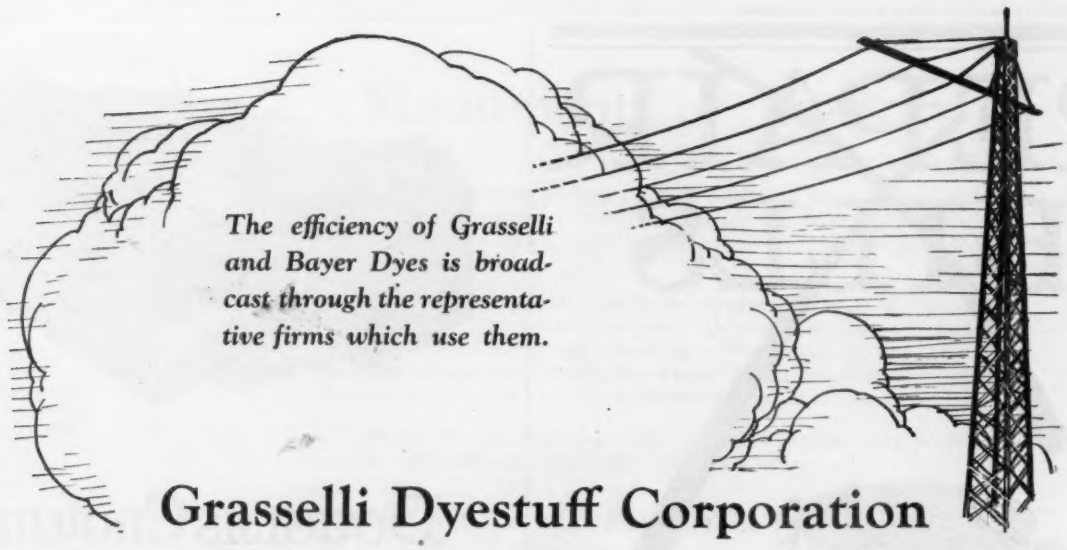
MARBLE-NYE COMPANY
Boston and Worcester, Mass.



Grasselli Dyestuff Corporation

Sole Importers of Colors manufactured by the Farbenfabriken vorm. Fried. Bayer & Co.

117 Hudson Street, New York

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We Specialize
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Design and Installation
of
FAN SYSTEMS
for
TENTER FRAME DRYING
and
VAPOR ABSORPTION SYSTEMS
for
DYEHOUSES

Let us design a new, or re-model your present drying system into an up-to-date efficient apparatus that will give maximum production.

SLOW DRYING MEANS LESS PRODUCTION

HUGH F. MUNRO & SONS
2406 North Mascher Street,
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ENGINEERS AND CONTRACTORS for FAN SYSTEMS FOR EVERY PURPOSE

A Few of the Facts

Protection to the tensile strength of wool and cotton yarns, better penetration of the dyes or bleach, as well as absolutely clean goods are only a few of the many reasons for the continually increasing demand by mills the country over for the special purpose alkalies

Wyandotte Textile Soda
Wyandotte Concentrated Ash
Wyandotte Kier Boiling Special

The microscope and camera in the hands of practical men have revealed many of the secrets of consistent production of high quality textile fabrics. When these powerful aids to investigation are turned upon fabrics treated with the Wyandotte Special Purpose Alkalies the splendid condition of the fibres denotes the beneficial results obtained by the use of these scientifically built mill supplies.

Then, too, when you compare the results obtained and the cost, you will be satisfied that these superior benefits do not add to your production expense.

Ask your supply man.

The J. B. FORD CO., Sole Mnfrs.
WYANDOTTE, MICHIGAN

Saving In Operating Costs *Warrants New* "HURRICANE" Equipment

THIS is proved every day by growing numbers of progressive manufacturers who keep careful records of costs in using "HURRICANE" equipment. That others may have a clear idea of how quickly investment is wiped out and of the size of consequent savings a number of disinterested surveys have been made. We will be glad to supply data that will be of value to you.

Catalogs Available on all "Hurricane" Machinery.

THE PHILADELPHIA DRYING MACHINERY COMPANY

Manufacturers of Dyeing, Drying Bleaching, Carbonizing, Shrinking and Finishing Machinery

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RODNEY HUNT MACHINE COMPANY

REEL MACHINES

Booklet No. 1119

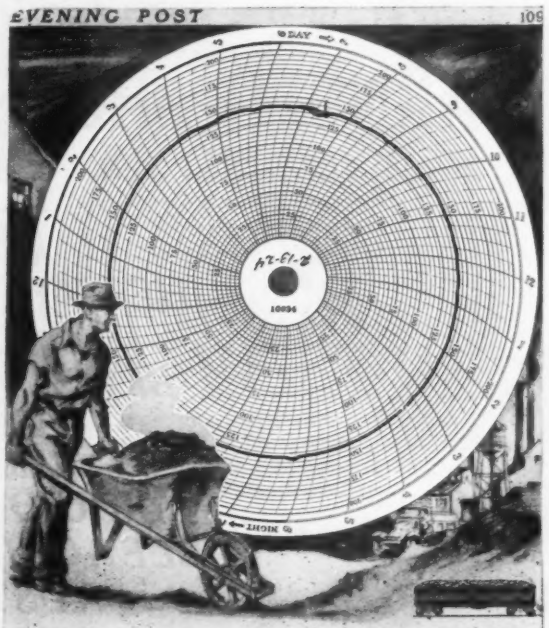
for

ARTIFICIAL SILKS

Gentle action combined with large production make them ideal for bleaching and dyeing this fabric.

RODNEY HUNT MACHINE CO.

47 Mill Street Orange, Mass.



If this Steam Record could talk

In Wisconsin is a paper mill which recently began to use Consolidation Clean Coal. What Consolidation Clean Coal now means to that plant is revealed by the steam record here reproduced

—it would tell you that in addition to serving as an illustration for the Consolidation Coal Company's recent advertisement in the Saturday Evening Post it is the 4,453rd record made by a Foxboro Steam Pressure Recorder that has been in constant service for over thirteen years.

The pen that made it has traveled over one and a half miles of chart, yet this record is as accurate and distinct as record No. 1.

You, too, can be sure of thousands of accurate records if you install Foxboro Instruments with the Improved Helical Tube Movement—permanent in calibration, guaranteed accurate for the life of the instrument.

Let us send you Bulletin "AS" 96-1.

THE FOXBORO CO., Inc.

Neponset Avenue, Foxboro, Mass., U. S. A.
New York Chicago Boston Philadelphia Pittsburgh
Cleveland Rochester Birmingham Tulsa
Los Angeles San Francisco Portland, Ore.

what its high heat value and its low ash content mean.

THE CONSOLIDATION COAL COMPANY
INCORPORATED
Munson Building - New York City

FOXBORO
REG. U. S. PAT. OFF.
THE COMPASS OF INDUSTRY

7142

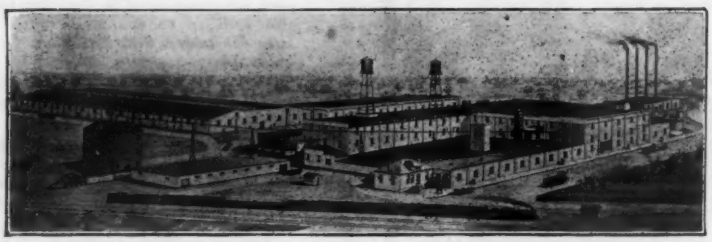
Established 1815

ARNOLD, HOFFMAN & CO., Inc.

Providence New York Boston Philadelphia Charlotte

All Kinds of
HEAVY CHEMICALS
Sole Agents for
BELLE ALKALI CO.
of Belle, W. Va.
Manufacturers of
LIQUID CHLORINE
BLEACHING POWDER
CAUSTIC SODA
Solid and Flaked

We solicit your inquiry for prompt or future delivery



VICTOR MILL STARCH

The Weaver's Friend

It boils thin—it penetrates the warps—increases breaking strength and carries the weight into the cloth. Being thoroughly washed free of gluten and other foreign matter it gives a bleach and finish to the goods that you can get from no other starch.

A trial order will convince you that VICTOR STARCH has no equal on the market.

THE KEEVER STARCH COMPANY, Columbus, Ohio

Southern Agent: MR. DANIEL H. WALLACE, Greenville, S. C.

If you are not already using VICTOR STARCH call on our representative for a demonstration at your convenience.

TEXTILE SPECIALTIES
JACQUES WOLF & CO.

For Cotton Fabrics

MONOPOLE OIL

Reg. U. S. Patent Office.

The ideal textile oil for better results in dyeing finishing, mercerizing, etc.

CREAM SOFTENERS

That give a smooth, soft, silky feel to cotton fabrics.

HYDROSULPHITE A.W.C.

for stripping and discharge printing.

INDIGOLITE

for indigo discharge printing only.

HYDROLIQUID

A stripping agent.

SOLUBLE OILS

In every concentration.
Made from No. 1 Castor Oil. Uniform in quality, testing up to specified strength.

BLEACHING OIL

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MANUFACTURING CHEMISTS AND IMPORTERS
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Western Representatives:
Aniline Color & Chemical Co.
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"HAWK"
The Dependable Thin Boiling
STARCH

"Hawk" is clean starch of full strength, very carefully made from selected raw material.

It is rigidly inspected at each stage of manufacture, and nothing but perfect starch is shipped.

"Hawk" can be furnished in any desired viscosity. Each shipment is uniform with the preceding one.

That is why leading mills find "Hawk" dependable.

STEIN, HALL & CO., INC.
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Southern Office:
908 Johnston Building
Charlotte, N. C.
Ira L. Griffin, *Manager*

Sole Representative in the United States for the Society of Chemical Industry in Basle, Basle, Switzerland

Two New Cibanone Colors

Cibanone Brilliant Sky-blue 8G

a vat color brighter and greener than direct sky-blue.

Cibanone Orange 6R

a vat color with exceptional redness and brightness.

These products possess excellent fastness to light, washing and chlorine, similar to other colors of this group.

Sole Selling Agents for Dow's Indigo and Midland Vat Blues

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Uniform in Application

VICTROLYN

Penetrating, Lubricating, Dependable Assistant in Warp Sizing

KLORASENE

will remove Oil Stains.

If you are troubled, write us.

BOSSON & LANE

Manufacturing Chemists

ATLANTIC, . MASS.

Warren Soaps

Preferred Stock

The best quality tallow, palm, and red oils and olive foots, carefully balanced with the purest chemicals for your special purpose.

Uniformity guaranteed by test before shipment.

Warren Soap Warren Service

Warren Soap Mfg. Co.

Established 1870

77 Summer St. Boston, Mass.

Incorporated 1890

Staley's Starch

Your mill problems? Staley service will help you solve them.

Staley experts analyze your individual mill conditions and compound special starches for each specific need.

Staley manufacturing facilities, the most complete and scientific in the industry, guarantee the absolute maintenance of prescribed properties in each starch employed.

Both quality and quantity of mill production are inevitably improved as a result.

A consultation with our technical staff carries no obligation. Write us.

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Decatur, Illinois
508 Andrews Law Bldg., Spartanburg, S. C.
J. W. Pope, Ansley Hotel, Atlanta, Ga.
25 Church St., New York City
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"BRETON" MINEROL

For
Knit Goods

"It improves the white"

BORNE, SCRYMSER CO.
Established 1874
17 Battery Place, NEW YORK
BOSTON **PHILADELPHIA**
Works: Bayway, Elizabeth, N. J.

ROLLER CLEARER SLASHER

Quality and Service
CLOTHS

Manufacturers are obtaining such perfect results from our Roller Cloths because it is made of the right material, with just the right cushion and uniformity of surface.
Our Clearer Cloth is constructed of the highest grade materials with strong nap that does not pull out and its uniform length is such that rolls are cleared entirely of short fibre.
Our Slasher Cloth is of the same high quality construction. It has sufficient cushion and is porous enough to thoroughly force the sizing into the yarn.
A small trial order will convince you of the superiority of these perfect cloths. Ask for sample and prices.

PHILADELPHIA FELT CO.
FRANKFORD, PHILADELPHIA, PA.

Southern Sales Agent, M. C. Sanders, Greenville, S. C.

The "Trojans" of the Weave Room

The ability to "take it" is inborn in Williams Shuttles. The shuddering impact experienced in being shot with lightning-like rapidity back and forth across the loom is met with stubborn strength and endurance. Their ability to stand up under rigorous usage is more than "skin deep."

Back of this durability is thoroughgoing attention to details. The wood block is never one that "will get by"—only 100% perfect blocks are used. The various units are assembled by competent well-paid workmen who view their work with pride.

You will find our experts helpful. *Their* services are *yours* on any subject regarding shuttles.

The J. H. Williams Company

"The Shuttle People"

MILLBURY, MASS.

Southern Representative: GEORGE F. BAHAN, Charlotte, N. C.

Before Installation Holcombe Bunch Builder 50 yds. of waste.

After Installation Holcombe Bunch Builder 3 to 10 yds. of waste.

It Has *Solved* The Yarn Waste Problem

The problem of yarn waste that has long confronted the textile executive has at last been solved. The HOLCOMBE AUTOMATIC BUNCH BUILDER saves 80% of the yarn waste that otherwise is a dead loss.

There are no wearing parts to the Holcombe to get out of order or wear out. It is a fool-proof bunch builder that is automatic in operation. The Holcombe builds the bunch **only** when the ring rail is lowered to doff. Requires absolutely no attention of the operator for setting or resetting—needs no oil.

Over 3000 installations are now in operation, giving excellent service to leading mills throughout the South.

Write today for full information of this new waste saving device.

Holcombe Bunch Builder Co.

Birmingham, Ala.

Service Branches: Charlotte, N. C.; Greenville, S. C.; Atlanta, Ga.

In view of comprehensive patent protection granted, any infringement will be vigorously prosecuted.

HOLCOMBE AUTOMATIC BUNCH BUILDER

SAVES 80% OF THE WASTE

Did you get our prices and samples on your last requisition for

LOOM REEDS (Woolen—Cotton—Duck—Plush)

HEDDLE FRAMES (With wood or iron ends)

HEDDLES (With or without inserted eyes)

We have been manufacturing since 1875 and during that time have helped many mills solve their weaving troubles. Why not let us put the experience we have gained by working out their problems at your disposal? Our plant is especially well equipped to take care of that *out of the ordinary* reed or heddle frame that you need in your line of work. *Don't wait.* Now is the time to get acquainted with the WALKER STANDARD of QUALITY and SERVICE.

WALKER MANUFACTURING CO., INC.

ESTABLISHED 1875

Kensington Ave. and Ontario St., Philadelphia, Pa.

Southern Office: 201 Augusta St., Greenville, S. C.

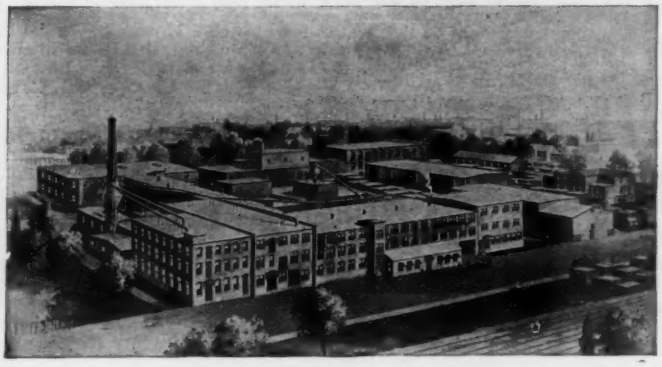
Bobbins Spools Skewers
Tubes Rolls
Manufacturers and Enamelers

OUR CUSTOMERS SAY

The careful attention that we give to the manufacture of their requirements means a stronger and more reliable Bobbin for them, while to us it means repeat orders.

We put all styles of reinforcements on Bobbins and Spools for conditioning of yarns.

All Bobbins enameled by our own process.



OUR PRODUCTS WHATEVER YOU USE WE MAKE

For service and prompt attention write us.

Walter L. Parker Co.
Lowell, Mass.

Long Lasting!

A spool that had the long lasting qualities and that would remain smooth and run true without the head breaking, splintering or coming off—such a spool has long been in demand by the textile industry.

Many spools have been designed to supply this demand—many of them are good—but in the Smil-Bob Spool we believe we have the last word in spool construction and back this belief with the reputation of the entire L. C. Smith Bobbin Works.

The Smil-Bob is the longest lasting spool that can be made. Its red, gray and black vulcanized fibre head is indestructible—it won't crack, chip or come off. The specially selected hardwood barrel is precision turned so that it will run true and perfectly balanced throughout its long life.

Smil-Bob Spools are real investments in spools. The saving they will effect in preventing yarn wastage, spool replacement, time and trouble will mean thousands of dollars in the pockets of textile mills this year.

Ask for full information and prices today.

L. C. SMITH BOBBIN WORKS
PHILLIPSBURG, N. J.

Exclusive Selling Representative:
THE HELBURN THOMPSON CO., Salem, Mass.

Southern Office:
201 Augusta St., Greenville, S. C.
M. C. Sanders, Manager.

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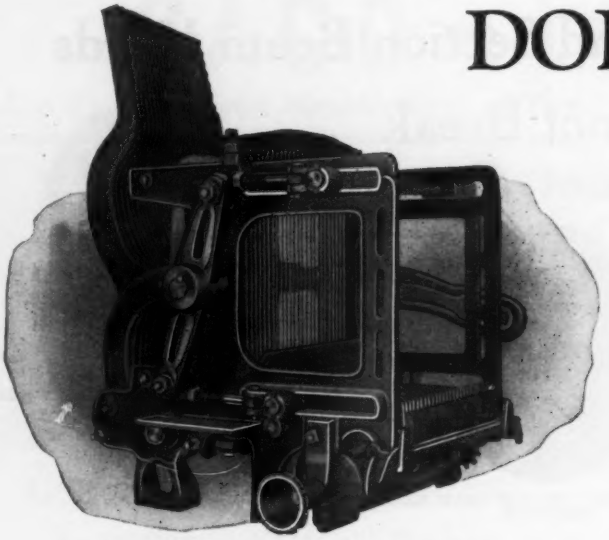
Indestructible
SMIL-BOB
Fibre Head SPOOLS

DOBBIES



Crompton & Knowles Double Index Dobby

We now equip dobbies of this type with pressed steel hook levers (patented) and drop forged top and bottom hooks (patented).

Slotted fingers and locking rod make it easy to remove, clean, and replace the fingers.

Crompton & Knowles Dobbies can be applied readily to any make or type of loom and will outwear any other dobbies on the market.

CROMPTON & KNOWLES LOOM WORKS

WORCESTER, MASS.

PROVIDENCE, R.I. PHILADELPHIA, PA. PATERSON, N. J.

S. B. ALEXANDER, Southern Manager, Charlotte, N. C.

If Expecting to Build or Enlarge a Weaving Mill

INVESTIGATE

THE HIGH-SPEED AUTOMATIC LOOM

BUILT BY

THE HOPEDALE MANUFACTURING COMPANY

at

MILFORD, MASS.

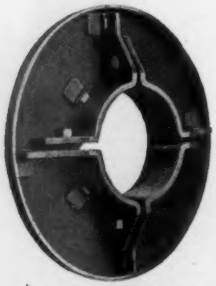
and already ordered by several successful manufacturers

All Steel Loom and Section Beam Heads

Cannot Break
Do not Bend

"ALL STEEL" LOOM BEAM HEAD
"MALLEABLE" GEAR
PATENT PENDING

"ALL STEEL" SECTION BEAM HEAD
PATENTED

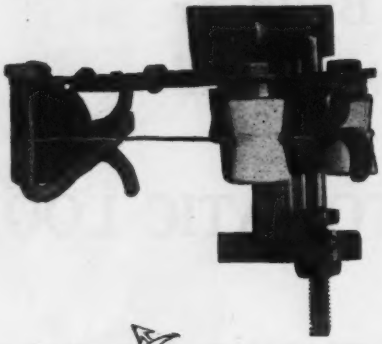


"ALL STEEL" ADJUSTABLE HEAD
SPLIT OR SOLID TYPE
PATENT PENDING

DUPLICATE YOUR CAST IRON HEAD IN STEEL—ELIMINATE ALL BREAKAGE
MAKE YOUR BEAM HEAD INVESTMENT PERMANENT

Mossberg Pressed Steel Corporation
Attleboro, Mass.

Radical Improvements Have Been Made In



The "ECLIPSE" SLUB CATCHER and TENSION DEVICE

It is entirely new in principle and operation. A new tension design has been attached to allow a change from warp to filling winding. Used successfully on both spoolers and winders. Adjusts itself to any size yarn, cotton, silk or wool.

Ask for full details today.

Eclipse Textile Devices, Inc.
ELMIRA, NEW YORK

MAKERS OF

Eclipse Automatic Yarn Cleaners
Eclipse Automatic Stop Motions
Eclipse Yarn Tension Devices
Van Ness Random Dyeing Machines

We are also makers of the famous Eclipse Bendix starter for automobiles and the time proven coaster brake for bicycles.

SACO-LOWELL

Largest Manufacturers of Textile Machinery in America

SERVICE TO MILLS OPERATING REVOLVING FLAT CARDS

For over twenty years we have maintained in Charlotte, N. C., a shop to reclothe top flats and rewind lickers-in.

The mill has the option of having their flats reclothed with either English or American Clothing.

For Lickers-in we use Point Hardened Wire manufactured by Saco-Lowell.

We equalize freight so that mills far distant can benefit by this service.

Flats and Lickers-in carried in stock to be loaned.

Methods and Tools are the same we use in manufacturing cards.

USE THIS SERVICE

by sending your flats and lickers-in to our Charlotte Shop for repairs.

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Sales Offices
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1924
Masonic Building
Greenville, S. C.

WHITIN MACHINE WORKS

ESTABLISHED 1831

TEXTILE MACHINERY

IMPROVED MODEL H WHITIN DRAWING FRAME

NEW WEIGHTING
NEW STOP MOTION
NEW GEARING
NARROWER WIDTH

EASY TO RUN AND ERECT
ASK FOR PARTICULARS

MAIN OFFICE AND WORKS
WHITINSVILLE, MASS., U.S.A.
SOUTHERN OFFICE CHARLOTTE N.C.

MORE
SOUTHERN SPINNERS
are using

AMTEX
TRADE MARK REGISTERED

SPINNING, TWISTING AND SPOOLER TAPE
Than ever before

This increasing demand indicates the superiority of AMTEX Tapes over all others.

We are pleased to build special Tapes for your particular needs.

Send us your specifications and we will guarantee satisfaction.

Manufactured by

AMERICAN
TEXTILE BANDING CO., INC.
GERMANTOWN, PHILADELPHIA, PA.
Sold in the South by
Charlotte Supply Co., Charlotte, N. C.
Wilson Company, Greenville, S. C.

NOW READY

1924 Cotton Handbook

Containing

American Cotton Crop Statistics

also

All European and Brazilian Statistics

Together with much useful and reliable information for the Cotton Trade.

Season 1924-1925

PRICE $1.00

(Special rates for quantity orders.)

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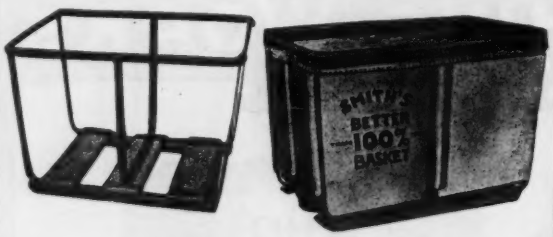
71 BROAD ST. NEW YORK



Baskets That More Economically Fill Your Needs

for the best doff baskets, storage baskets and distributor baskets. When they are apparently worn, slip on a new cover, and you have a basket as good as new.

The sturdy frame of SMITH'S 100% BASKETS is constructed of steel—practically indestructible—and has cross slats and skids of wood.

Light in weight, and rough handling does not affect SMITH'S 100% BETTER BASKETS. They last a lifetime.

Get in touch with us. Prices?

SMITH MFG. COMPANY
DALTON, GA.

SMITH'S TRADE 100% MARK BETTER BASKETS

AMERICAN
SUPPLY COMPANY
PROVIDENCE, R. I.

Manufacturers of

LOOM HARNESS,
WEAVING REEDS,
OAK TANNED LEATHER
BELTING, STRAPPING,
ETC.

We make a specialty of Harness for Warp Drawing Machines

Guaranteed Textile Brushes

PERKINS PRACTICAL BRUSH

ATLANTA BRUSH COMPANY

Live and Learn!

We have been making Textile Brushes for many years—good textile brushes—and yet, almost every day, we find some way of making some particular brush better.

Did you see our line at the Greenville Exposition? If you did you'll appreciate how much we have improved Perkins Practical Brushes. If you did not, we want to send you a little 12-page folder which we have just issued and which describes practically every brush used by cotton mills.

You will find it invaluable.
Write for it today.

ATLANTA BRUSH CO.
ATLANTA, GA.

ATLANTA BRUSH COMPANY

A BRUSH FOR EVERY TEXTILE NEED

CLEAN FLOORS

in Hard-to-Reach Places and Small Areas

If you believe your mill is too small for CLEAN FLOORS, or if you believe your floors are hard to get at, you should know about the FINNELL No. 10 and No. 16 Scrubbers. The Aberfoyle Mfg. Co., of Chester, Pa., is one of many large textile concerns using the No. 10 to supplement larger FINNELL machines. Smaller establishments may find these smaller machines sufficient for effective and economical scrubbing.

The FINNELL SYSTEM *of Electric Scrubbing* includes scrubbers of five models including the right one for your plant whether you have a hundred square feet or a million. Any FINNELL Scrubber gets floors *cleaner* in less time and at less cost than the old-fashioned hand-and-knee method with its sloppy pail and dirty water. The No. 10 is especially handy. It goes under anything 6 inches from the floor and into alleys 14 inches wide. As easy to use as a vacuum sweeper. Folds up when not in use.

Free Booklet!

"Electric Scrubbing" will be sent to any executive on request, together with our latest broadside containing large pictures and full description of FINNELL Equipment in various sizes.

AMERICAN SCRUBBING EQUIPMENT SALES COMPANY

District Offices in Principal Cities

511 NORTH COLLIER ST. HANNIBAL, MO.

Power Scrubbing Headquarters for 19 Years

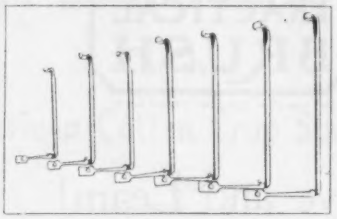
FINNELL SYSTEM

OF ELECTRIC SCRUBBING

"Clean Floors Reflect Clean Business"

Growth A Tribute To Worth
1883
1924
For the past 40 years the David Brown Co. has been known to hundreds of textile mills throughout the country as headquarters for "Superior" brand quality products. And today "High Grade" brand products are demanded wherever textile products are used. The reputation established 40 years ago is upheld today by the hundreds of workmen at the four big plants in Massachusetts, Maine, New Hampshire and Vermont.
"High Grade" products include: Plain and Automatic Loom Shuttles, Warp Bobbins, Filling Bobbins, Card Room Bobbins, Plain and Metal Head Warper and Twister Spools, Automatic Loom Bobbins, etc. Particular attention is called to our bobbins and spools fitted with our special metal shields of all kinds and types, and the metal enamel finish in any
THE DAVID BROWN CO.
"High Grade" Bobbins, Spools and Shuttles
LAWRENCE, MASS.
GOLD MEDAL
SILVER MEDAL
The David Brown Co.
Lawrence, Mass.

Keep the Wheels Turning Full Speed



Repairs Save You Money

The life of your machinery for capacity production and efficiency of your help depend on the upkeep of your plant. Careful inspection by the expert mechanics of this company quickly locates the overhauling necessary. We make "like new" repairs and you have a mill ready for the "peak load."

Catalog on request

Southern Spindle & Flyer Co., Inc.
CHARLOTTE, N. C.

"We manufacture,
Overhaul and Repair Cotton Mill Machinery"

W. H. MONTY, Pres. and Treas.
W. H. HUTCHINS, V. Pres. and Secy.

Sonoco Parallel Tubes are exact in diameter, balanced and clean cut.

Take Your Choice!
With or without the Cushion but be sure you order SONOCO

Sonoco Products Co., Mfr.
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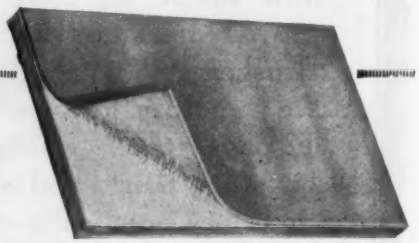
Eastern Office, 410 Olympia Bldg., New Bedford, Mass.
Canada, W. J. Westaway Co., Ltd., Hamilton, Ont.



A new material for mill trucks!

Why Haskins Veneered Steel is proving so successful

The photograph above shows a section of Haskins Veneered Steel. Note the outer strips which are made of galvanized steel, inclosing a wood core. A patented construction binds them closely together.

The Purpose of the steel
—is to make trucks which can ward off the severe blows encountered in daily mill use. It also provides a smooth surface which cannot injure or tear the most delicate of fabrics.

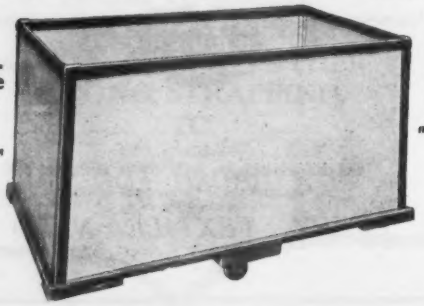
The Purpose of the wood
—is to keep the weight of the truck down so that it can easily be handled, and accurately guided about the mill.

The many years of service which Haskins Veneered Steel has given, fully justifies the claim that over ten years, without repairs, will be the average life of the new Haskins "Armord" trucks. Judging from the warm reception these trucks have already met with, they satisfy the real need which its owners recognized. Further data gladly sent on request.

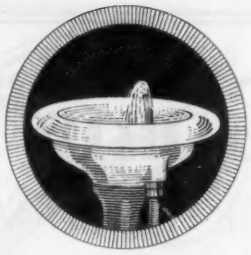
R. G. HASKINS CO.
520 W. Monroe St.
Chicago Illinois

HASKINS "ARMORD" TRUCKS

Trucks that are



"slam-bang proof"



Always in Use

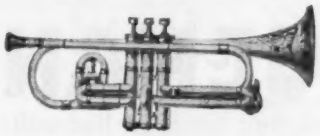
R-S Vertico-Slant Drinking Fountains are in use every day. Thirst knows no seasons, and R-S Fountains give year 'round service.

Lips cannot touch the nozzle—the source of most drinking contamination is automatically eliminated. Pure, fresh water is always at hand to satisfy thirst sanitarily. Your workmen benefit, and so do you.

The new catalog F contains complete information on the entire R-S line. It includes prices and specifications. Select the fountain that is best suited to your needs. Write for your copy today.

RUNDLE-SPENCE MFG. CO.
57 FOURTH STREET MILWAUKEE

R-S "Lips can't touch the R-S nozzle" R-S



A Band Helps to Make Contented Workmen

INDUSTRIAL bands are a great force for good—welding a body of employees together, inspiring loyalty, providing amusement and recreation and actually speeding up production.

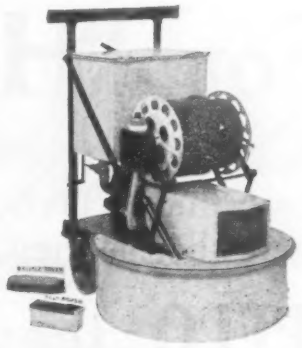
Conn will Help You Organize

We've helped to organize and have equipped hundreds of bands—our experience is at your service, without obligation. Conn instruments, easy to blow, beautiful in tone, perfect in scale, reliable in action—ideal for beginners as well as professionals.

Write today to

C. G. CONN, LTD.
1115 Conn Bldg. Elkhart, Ind.

JOHN PHILIP SOUSA *uses and endorses Conn instruments.*



Cleaned Scrubbed Floors an Advantage in Any Building or Plant

Our New No. 5 Eight Brush Power Scrubbing Machine Will Scrub Your Floors Daily without Effort or Drudgery

We have spent years in perfecting a practical machine that is almost perfect in construction and operation. The machine has the following features:

1. Self propelled at the rate of 110' per minute and scrubs a path 26" wide.
2. A squeegee connected to the machine conveys the dirty water to one spot where it is easily removed.
3. The machine sells for less money than any eight brush machine on the market.
4. Machine is guaranteed against breakage and is ball bearing throughout.
5. Machine is designed so that it is possible to scrub close to walls, corners, floor obstructions, etc.
6. Machine constructed so as to make for easy handling on elevators, etc.
7. Machine capable of carrying felt brushes (Write for particulars relative to this feature).

We Ship This Machine On Approval Any Where In U. S. Saving Of 50% In Floor Cleaning Expense.

D. R. VAIL & COMPANY
6754 SHERIDAN ROAD CHICAGO, ILL.
Cable Address: Vailco—Chicago

For "Heavy Going"

"a-wheel" or "a-foot," Tupelo floors in Textile Mills, Factories and Warehouses seem to actually grow solider and smoother as they grow older. Nature has supplied

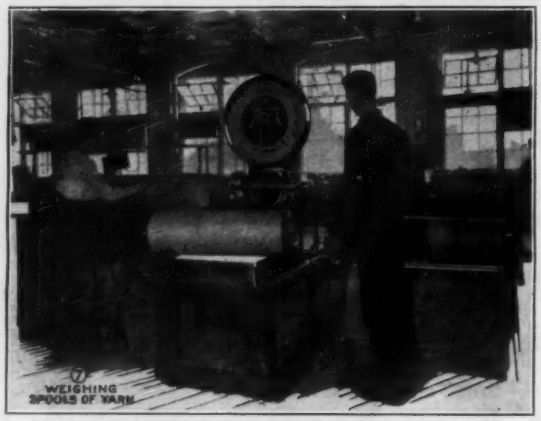
TUPELO, the "Hard Wear" Lumber

with a closely "knitted" or involved grain, which accounts for its non-slivering, non-splintering and long-wear characteristics.

For *all* the Tupelo facts—please write

SOUTHERN CYPRESS MANUFACTURERS' ASSOCIATION

805 Poydras Building, New Orleans, La., or 805 Graham Building, Jacksonville, Florida.



Automatic Scales

For Weighing or Checking

Raw Material
Sorts
Soap, Alkali and Dyes
Balls and Sliver
Test Pieces
Tops
Laps
Bobbins
Roving
Yarn
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Section Beams
Shipments
And for many other purposes.

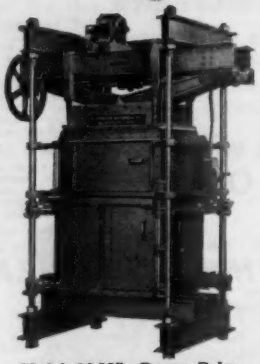
Toledo Scale Company, Toledo, Ohio

Canadian Toledo Scale Co., Limited, Windsor, Ontario
Largest Automatic Scale Manufacturers in the World
106 Sales Rooms and Service Stations in the United States and Canada. Others in thirty-four foreign countries

LOGEMANN

Hand-Belt-Electric-Hydraulic

Baling —— Presses



Model 26-MS. Power Baler specially designed for export yarn baling.

For Waste—
Hand-operated Balers—
Deep-box power Balers—
Hydraulic Balers—

For Finished Goods—
Hand-operated Balers—
Power toggle-lever Balers—
Hydraulic high-density Balers—

For Yarns—
High-density power Balers—

There is a LOGEMANN baler for every purpose.
Write for details specifying your needs.

LOGEMANN BROTHERS CO.
Main Office & Works - Milwaukee, Wis.

The
Cement Paint

Zemco-lite

TRADE MARK

Permanent Paint Economy

The basis of the extreme economy of Zemco-lite lies in the aggregate of pure WHITE Portland Cement. You build with cement for permanence—why not paint with cement? Zemco-lite is the practical commonsense coating for walls and ceilings, for it possesses the same characteristics of the walls themselves and when applied sets and hardens as an integral part of the wall, and it never cracks or peels off.

Do not confuse Zemco-lite with "cold water paints" or calcimines which are all made of whiting or other pigments, blended with soluble glue. They bear no relation to Zemco-lite save in the manner of mixing. Zemco-lite comes in a super-fine white powder and is mixed with water just as concrete is mixed with water.

Zemco-lite, being a perfect non-conductor of heat, makes an excellent covering for steam pipes. It is the most economical means of minimizing losses from steam radiation.

The initial cost of Zemco-lite is one-third the cost of liquid coatings and the cost of application is proportionately less, for one good coat well applied does the work, thus saving you not only good money in oil and mixed paints, but the labor and time in putting on the two or three coats required by liquid whites to secure satisfactory service.

In short, Zemco-lite is not only the whitest white—but it stays white permanently and costs less, first and last.

If you are not among the many mills who are already using Zemco-lite, we want to ask you to give it a fair trial and let it speak for itself. May we send full details?

American Cement Paint Co., Chattanooga, Tenn.

Steel Roofing and Siding

Good steel is the logical material for roofing and siding on industrial buildings. Its ease of erection, high salvage value and moderate cost are all in its favor.

Steel roofing has been found to be an almost absolute protection against lightning, and it is also an excellent safeguard against fires from exterior sources.

Where good steel is used and the gauge is not too light, excellent service can be expected from this class of roofing.

We recommend "Youngstown" Copperoid Steel for Roofing and Siding. Its slight extra cost will be repaid many times in its long life.

"Youngstown" Roofing and Siding can be had in all standard styles and gauges. It is carried in stock by leading jobbers in all parts of the country.

The Youngstown Sheet & Tube Company

YOUNGSTOWN, OHIO

DISTRICT SALES OFFICES

BOSTON—Massachusetts Trust Bldg.
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For Your Individual Requirements, We are prepared to Compound Paints of Special Specifications.

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MILL WHITE PAINT
FLAT, EGGSHELL,
AND GLOSS

WARREN'S
COATEX
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MILL, COTTAGE
AND HOUSE PAINTS
LIQUID OR PASTE

THE WARREN COMPANY

PAINT AND GLASS DIVISION

875 E. FAIR ST., ATLANTA, GEORGIA

Get a good "mix"

You can't unless you use clean Sand and Gravel — washed, screened and sized to exact requirements. Insist on

***Arrowhead* SAND and GRAVEL**

products of a modern, electrically operated plant Capacity, 4000 tons daily. And that means shipping service that spells progress and profits for you. Drop us a line!

MONTGOMERY GRAVEL Co.

Plant 4000 Tons Daily — ARROWHEAD, ALA.

Shepherd Bldg. — MONTGOMERY, ALA.

VOGEL
PATENTED

Frost Proof Closets

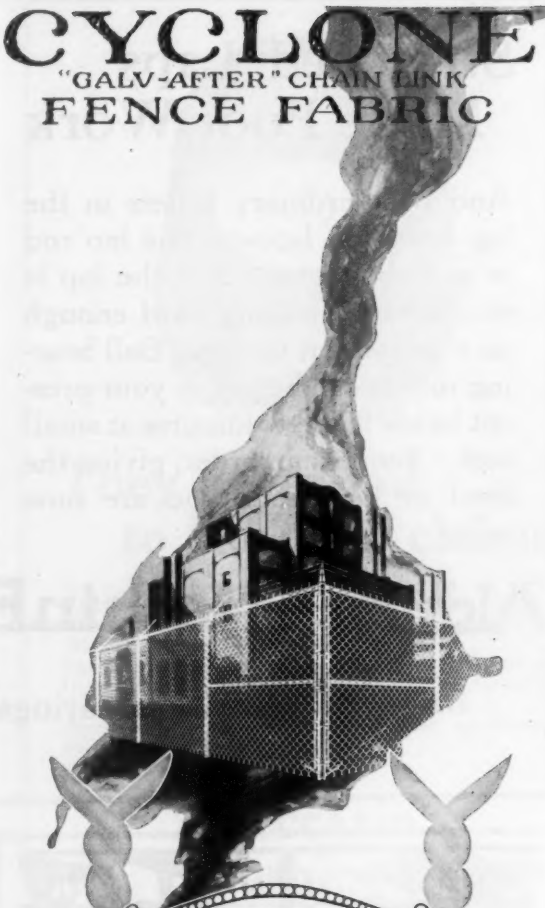
350,000 giving satisfaction. Save Water; Require no Pit; Simple in the extreme. The most durable water closet made. In service winter and summer.

- Enameled Roll flushing rim bowls.
- Heavy Brass valves.
- Strong hardwood seat.
- Galvanized tank.
- Malleable seat castings will not break.
- Tested under hydraulic pressure before leaving factory.

ASK YOUR JOBBER

JOSEPH A. VOGEL CO.
WILMINGTON, DELAWARE

CYCLONE
"GALV-AFTER" CHAIN LINK
FENCE FABRIC



You can buy more real value for your dollar today in chain link fence fabric than ever before. For Cyclone "Galv-After" Chain Link Fence Fabric resists corrosion, affords permanent property protection. Lasts years longer. No annual painting required.

"Galv-After" Chain Link Fence Fabric is Heavily Zinc-Coated (or Hot Galvanized") by Hot-Dipping Process AFTER Weaving. It has a protective zinc coating, approximately five times as fence fabric made from wire galvanized **before** weaving.

We also build Iron Fence, in various patterns, for industrial use.

Write nearest office, Dept. 35, for complete information

CYCLONE FENCE COMPANY

Factories and Offices:
Waukegan, Ill.; Cleveland, Ohio; Newark, N. J., Fort Worth, Texas, Oakland, Calif., (Standard Fence Co.) Portland, Oregon (Northwest Fence & Wire Works).

Cyclone "Red Tag" Fence and Products

The Mark of Quality Fence and Service

PROPERTY·PROTECTION·PAYS

In *Richmond, Indiana* or in *Rangoon, India*

WHEREVER pulleys are turning. In any factory. In any country. A Graton & Knight Standardized Series Belt is always the same.

The Standardized Series is a grouping of brands of Graton & Knight Leather Belts. Each made to rigid specifications to do its type of work best. Each held to unvarying *standards* all the way through so two belts of the same Standardized Series brand must be identical in every respect.

Replacements stop being a source of trouble. Just order the same Graton & Knight Standardized Series Belt. Put it to work with pleasant certainty. Sure it will deliver power as faithfully as the veteran it replaces. For two belts of any one Standardized Series brand are always exactly the same, whether you buy them in India or Indiana!

They will always be made of the same honest, pulley-hugging leather. The same in weight, thickness and flexibility. Built to give you the same extra-long, economical transmission service.

Write for booklet 101-O, which gives full information about Standardized Series belts for textile mills.

THE GRATON & KNIGHT MFG. CO.
Tanners—Makers of Belts and Other Leather Products
Worcester, Mass.

GRATON & KNIGHT

Check this list of Graton & Knight products for informative booklets on the subjects which interest you.

Flat Belt	Lace Leather	Whole Leathers
Round Belt	Leather Packings	Cements
Fan Belts	Leather Straps	Preservatives

GRATON & KNIGHT
Standardized
LEATHER BELTING

STRONG GRIP-LONG LIFE

RHOADS TANNATE

LEATHER BELTING

LEATHER Belt has more pulling grip than any non-leather belt. Tannate has more than any oak leather belt. If you doubt this, visit our testing laboratory at Wilmington, Del. Then check up our tests by any other evidence. We want you to know whatever truth will help you to the best transmission. If you have puzzling problems consult our engineers. Watershed Tannate will work under water.

J. E. RHOADS & SONS

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CHICAGO 316 W. Randolph St. — ATLANTA 67 S. Forsyth St.
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Stretched Laps Make Poor Work

And with ordinary rollers in the lap heads on lappers, the lap rod is so hard to turn that the lap is stretched by pulling hard enough on it to cause it to turn. Ball bearing rollers can be put in your present heads in a few minutes at small cost. Send us an order, giving the kind of lap heads you are now using.

AldricH MachinE Ball WorkS Bearings

Greenwood, S. C.

Approximately 1,500,000 Barrels "Royal Cement" Shipped Into Southeastern States Last Year

DIXIE PORTLAND CEMENT CO. ROYAL CHATTANOOGA, TENN.

Is tested in our laboratory every 60 minutes. The quality of our product is only equaled by our service in the handling of large jobs.

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CHATTANOOGA, TENN.

CRESSON-MORRIS CO.

POWER TRANSMITTING MACHINERY

Merit Plus Recognition

"The heights by great men reached and kept were not attained by sudden flight."

Time, skill and effort must also precede merit as surely in machinery as in men.

Time, skill and effort must also precede merit in order to obtain and maintain for merit the recognition it deserves.

The great number of large installations of Cresson-Morris Power Transmitting Machinery is proof of both the merit and the recognition of the merit that nearly three score years of skill and effort have endowed it with.

The cumulative knowledge of all this experience is always available to you in the recommendations of our engineers.

CRESSON-MORRIS COMPANY

ENGINEERS—FOUNDERS—MACHINISTS

PHILADELPHIA, PENNA.

They never fail to back our claims

We claim that the Moccasin Bushing is the most reliable equipment you can install in your Textile Machinery, in loose pulleys or in any other bearing that has proved troublesome.

The Moccasin requires oiling but a few times *yearly*. It supplies clean, filtered oil to the bearing surfaces. It minimizes friction and lasts indefinitely.

There is no waste—no dripping of oil to damage floors, belting or stock.

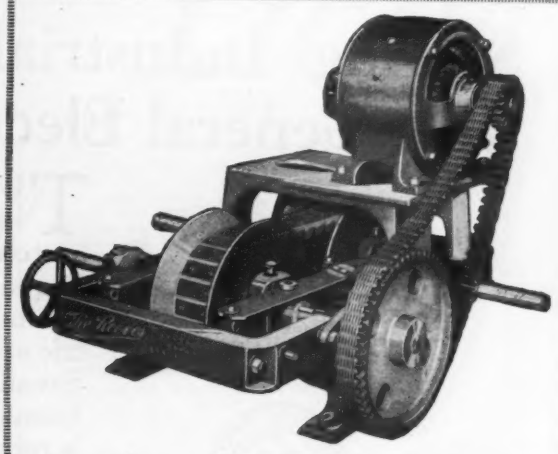
These are our claims and

Moccasin Bushings

have backed them up to the letter, as any of the following manufacturers will testify.

Anchor Duck Mills	Rome, Ga.
Avondale Mills	Birmingham, Ala.
Anthony Company, Bryan W.	Fall River, Mass.
Bibb Mfg. Company	Macon, Ga.
Brogan Mills	Anderson, S. C.
Butler Mills	New Bedford, Mass.
Columbia Textile Company	Lowell, Mass.
Crown Cotton Mills	Dalton, Ga.
Crystal Springs Bleachery Co.	Chickamauga, Ga.
Dallas Mfg. Co., The	Huntsville, Ala.
Dixie Spinning Mills	Chattanooga, Tenn.
Dixie Mercerizing Co.	Chattanooga, Tenn.
Dorranceton Silk Works	Kingston, Pa.
Dwight Mfg. Company	Alabama City, Ala.
Eagle & Phoenix Mills	Columbus, Ga.
Elk Cotton Mills	Dalton, Ga.
Erwin Cotton Mills	West Durham, N. C.
Flint Mills	Fall River, Mass.
Fulton Bag & Cotton Mills	Atlanta, Ga.
Hillside Cotton Mills	LaGrange, Ga.
Hillsborough Mills	Wilton, N. H.
Home Cotton Mills	St. Louis, Mo.
Jenckes Spinning Co.	Pawtucket, R. I.
Lullwater Mfg. Co., The	Thomson, Ga.
Manville-Jencks Co.	Pawtucket, R. I.
Massachusetts Mills	Lindale, Ga.
Massachusetts Mills	Lowell, Mass.
New England Southern Mills	LaGrange, Ga.
Peerless Cotton Mills	Thomaston, Ga.
Quissett Mills	New Bedford, Mass.
Richmond Hosiery Mills	Rossville, Ga.
Riverside and Dan River Cotton Mills	Danville, Va.
Standard-Coosa-Thacher Co.	Chattanooga, Tenn.
Shawmut Mills	Shawmut, Ala.
Spartan Mills	Spartanburg, S. C.
Thomaston Cotton Mills	Thomaston, Ga.
Trion Co., The	Trion, Ga.
United Hosiery Mills Corp.	Chattanooga, Tenn.
Unity Cotton Mills	LaGrange, Ga.
Victor-Monaghan Mills	Greer, S. C.
WeWst Point Mfg. Co.	West Point, Ga.
Willingham Cotton Mills	Macon, Ga.

MOCCASIN BUSHING CO.
CHATTANOOGA, TENN.



Another REEVES Achievement---Variable Speed Individual Drive

REEVES—the world's leading builder of variable speed transmission—now offers a Variable Speed Individual Drive!

This compact unit has been especially designed for use where individual motors are needed, or where it is necessary to conserve space. It offers the combined efficiency and accuracy of "THE REEVES" Variable Speed Transmission and a constant, high speed motor to those manufacturers who have heretofore used expensive, inefficient variable speed motors and "makeshift" speed control devices.

"THE REEVES" Variable Speed Individual Drive enables the operator to obtain any speed whatever between fastest and slowest on any type of machine or conveyor. No "steps" in speed, but any speed on the curve, even to a fraction of a revolution. Any one speed may be maintained indefinitely, or it may be changed as often as necessary. When the desired speed is once obtained, it remains positive and "set" regardless of the load fluctuation, until changed by the operator.

"The Reeves"

Variable Speed Individual Drive

Consists of a constant, high speed motor mounted above and connected with "THE REEVES" Variable Speed Transmission. The connection may be either by silent chain and sprockets or by gears. Built in sizes to give from 1 to 50 H.P., and ratios of from 2:1 to 16:1. Furnished with handwheel, sprocket and chain, remote electrical, remote mechanical or automatic controls. Complete ball bearing throughout may also be furnished with the new steel link V-belt on transmission proper at additional cost.

Undoubtedly there are many places in your plant where such a compact unit will save you time and money. Write today for copy of our bulletin C-3050 for details and full information.

REEVES PULLEY COMPANY
COLUMBUS, INDIANA
Detroit Branch: 135 High St., West.
Reeves-Bond Sales Co., 39 So. Clinton St., Chicago, Ill.

Serving Industrial Georgia with General Electric Products

TO give service that is second to none is as important to us as to supply our industrial customers with materials that are unsurpassed in quality. In the interest of prompt shipments, we maintain a complete stock of General Electric and other standard lines in our Atlanta and Savannah warehouses. Every order taken from our enormous stock is shipped the day it is received.

For twenty years, many of Georgia's industrial plants have depended without a single instance of disappointment in Carter Service for their electrical requirements.

CARTER ELECTRIC CO.

Distributors

Atlanta **Savannah**

ELECTRICAL SUPPLIES

GENERAL ELECTRIC CO.'S PRODUCTS—MOTORS, WIRE, WIRING DEVICES, ELECTRICAL, PORCELAIN CONDUIT AND FITTINGS, TRUMBULL SWITCHES.

Complete Stocks in Columbia for Prompt Shipment.

PERRY-MANN ELECTRIC COMPANY

COLUMBIA, S. C.

BOILERS

of the

Water Tube and Tubular Types

OUR SPECIALTY

WALSH & WEIDNER BOILERS with our improved Steel Casing make the ideal Steam Plant. The cost of installation is moderate, the plant looks neat, cost of repairs is slight and they will save from 10 to 25% of your fuel bill.

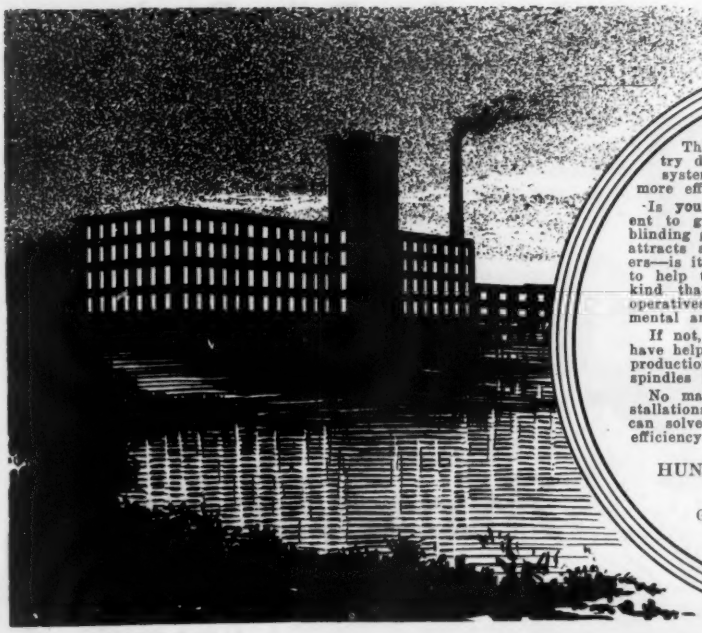
We also manufacture Tanks of all description, Towers and Tanks, Steel Stacks, Steel Breeching, Smokestacks, Structural Steel and Plate Steel Work.

Write for our new catalog.

The Walsh & Weidner Boiler Co.

CHATTANOOGA, TENN.

New York Chicago San Francisco Memphis Havana
Kansas City Jacksonville New Orleans



LIGHT!

Those production-reducing, dark, wintry days are here and artificial lighting systems are being put into condition for more efficient and greater production.

Is your lighting system adequate—efficient to give light in every corner without blinding glare—is it the kind of system that attracts and holds the best class of workers—is it the kind that piece workers want to help them earn more money—is it the kind that spreads good cheer and keeps operatives in better spirit with the utmost mental and physical alertness?

If not, let H. & G. help you, just as we have helped light the way to greater winter production for nearly two million happy spindles in the South.

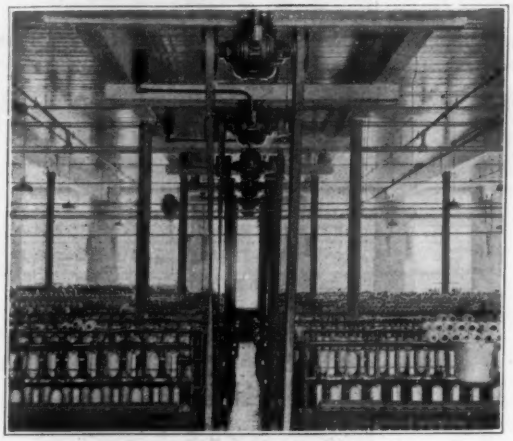
No matter how large or small your installations may be, the H. & G. engineers can solve them with the highest degree of efficiency and economy.

HUNTINGTON & GUERRY, INC.
GREENVILLE, S. C.

HUNTINGTON & GUERRY TROUBLE PROOF ELECTRICAL INSTALLATIONS

H & G TROUBLE-PROOF ELECTRICAL INSTALLATIONS

Textile Motors



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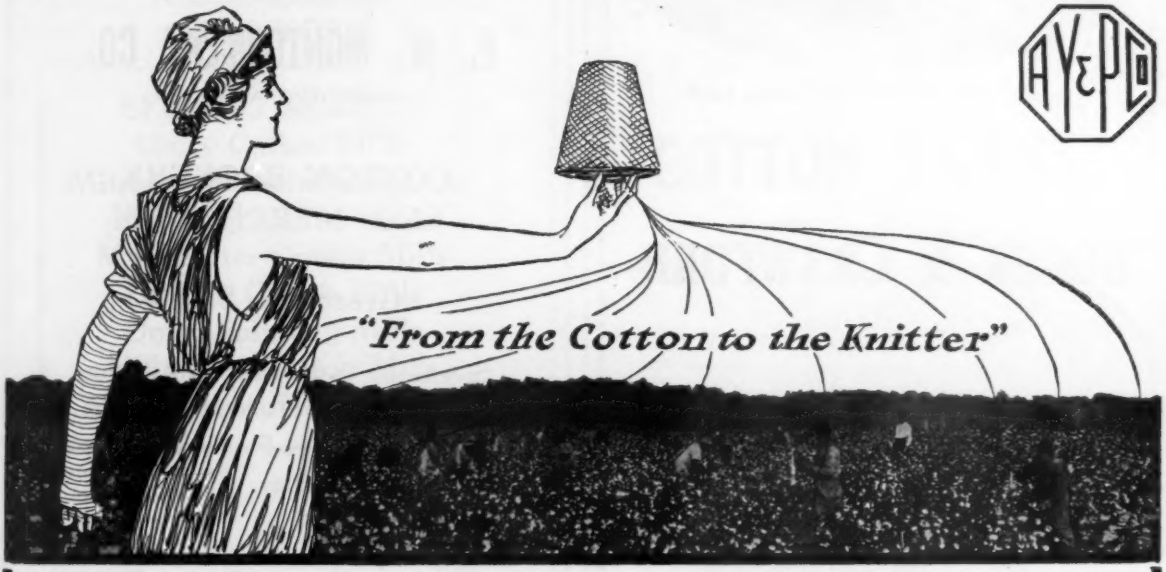

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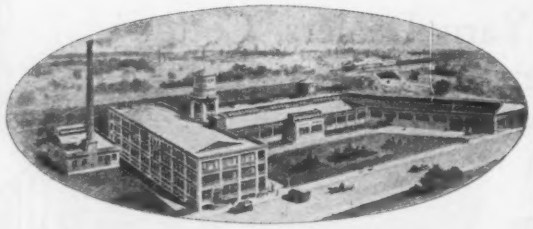

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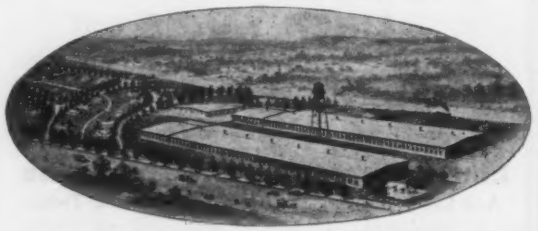

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Gessner, David
Klauder-Weldon Dyeing Machine Co.
Philadelphia Drying Mchry. Co.
Proctor & Schwartz, Inc.
Sargent's Sons & Co., C. G.
Textile Finishing Mchry. Co.
Tolhurst Mch. Works.

CARDING MACHINERY AND SUPPLIES.
Gessner, David
Howard & Bullough.
Proctor & Schwartz, Ins.
Roy & Son, B. S.
Saco-Lowell Shops.
Southern Spindle & Flyer Co.
Whitin Machine Works.
Woonsocket Mch. & Press Co.

CARD & NAPPER CLOTHING.
Howard Bros. Mfg. Co.

CARD FEEDS.
Gessner, David
Easton & Burnham Mch. Co.
Proctor & Schwartz, Ins.
Schofield Co., Wm.
Whitin Machine Co.
Woonsocket Mch. & Press Co.

CARD GRINDING MACHINERY.
Easton & Burnham Mch. Co.
Proctor & Schwartz, Inc.
Roy & Son, B S.
Whitin Machine Works.

CARPET MACHINERY.
Butterworth & Sons Co., H. W.
Crompton & Knowles Loom Works.
Gessner, David
Philadelphia Drying Mchry. Co.
Proctor & Schwartz, Inc.
Schofield, Wm., Co.
Textile Finishing Mchry. Co.

CARRIER APRONS.
(See Aprons.)

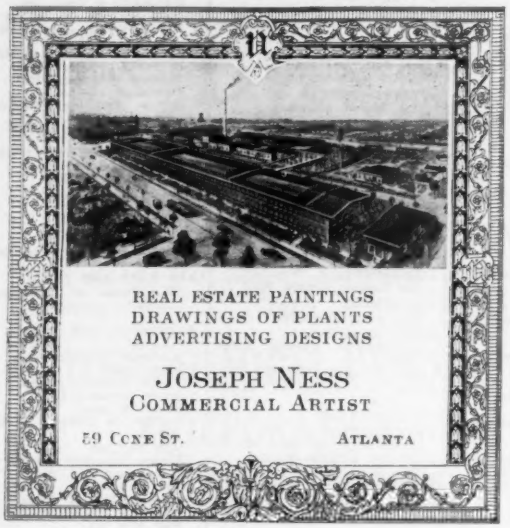
CARRIER SYSTEM.
Curtis Pneumatic Machry. Co.
Louden Machinery Co.
Mathews Conveyor Co.

CASES—WOODEN.
(See Packing Cases.)

CASTINGS—IRON
Briggs, Schaffner Co.
Cresson-Morris Co.
Lombard Fdry. & Mch. Co.
Piedmont Iron Works
Walsh & Weidner Boiler Co.

CASTINGS—BRASS, BRONZE, ALUMINUM.
Piedmont Iron Works.

CAUSTIC SODA.
(See Bleaching Materials.)



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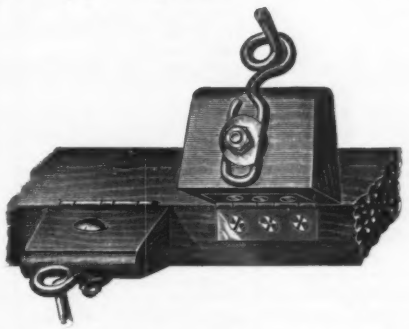

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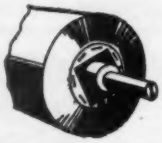

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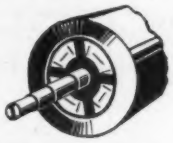

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BUYERS' INDEX—Continued.

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Dixie Portland Cement Co.

CEMENT REINFORCEMENT.
Birmingham Slag Co.
Truscon Steel Co.

CEMENT AND BRICK COATING.
American Cement Paint Co.
Dixon Crucible Co., Jos.
Hockaday Co.
Sonneborn Sons, Inc., L.
Truscon Laboratories.
Wadsworth, Howland & Co., Inc.

CENTRAL STATION (ELECTRIC).
Tennessee Electric Power Co.

CENTRIFUGALS.
Cresson-Morris Co.
Fletcher Works.
Hardeman, Isaac.
Schaum & Uhlinger.
Tolhurst Mch. Wks.

CHAIN DRIVES.
(See Belting—Chain Link.)

CHAIN—BLOCK, BICYCLE, AUTO, ENGINE, AGRICULTURAL, ETC.
Baldwin Chain & Mfg. Co.
Diamond Chain & Mfg. Co.
Fulton Supply Co.
Link Belt Co.
Morse Chain Co.

CHAIRS AND STOOLS.
(See Furniture—Mill.)

CHECK STRAPS.
Bond Co., Chas.
Fulton Supply Co.
Graton & Knight Mfg. Co.
Houghton & Co., E. F.
Jacobs Mfg. Co., E. H.

CHEMICALS.
(See Dyestuffs and Chemicals.)

CHLORINE GAS.
Electro Bleaching Gas Co.
Mathieson Alkali Works, Inc.

CLEANING AND AERATING MACHINE FOR COTTON.
Murray Company, The.

CLEARER CLOTH.
(See Cloth.)

CLOCKS—HANK, ETC.
(See Counters.)

CLOCKS (TIME).
Detex Watchclock Corporation.
Root Co.

CLOCKS—WATCHMAN.
Detex Watchclock Corporation.
Foxboro Co., Inc.
Root Co.

CLOSETS—WATER.
(See Toilets.)

CLOTH (ROLLER, CLEARER AND SLASHER).
Best & Co., Edw. H.
Phila. Felt Co.

CLOTH CUTTERS.
Firsching, J. A.
Foster Machine Co.
Wildman Mfg. Co.

CLOTH ROOM MACHINERY.
Butterworth & Sons Co., H. W.
Firsching, J. A.
Foster Machine Co.
Gessner, David.
Hopedale Mfg. Co.
Saco-Lowell Shops.
Textile Finishing Mchry. Co.
Williams Co., J. H.
Wildman Mfg. Co.

CLOTH SHRINKING MACHINERY.
Gessner, David.
Philadelphia Drying Mchry. Co.
Proctor & Schwartz, Inc.
Reliance Machine Works.
Tolhurst Mch. Wks.

CLOTH WINDERS.
(See Winders.)

CLUTCHES—FRICTION.
Allis-Chalmers Mfg. Co.
Carlyle-Johnson Machine Co.
Cresson-Morris Co.
Fulton Supply Co.
Link-Belt Company.

CLUTCH LININGS.
Carlyle Johnson Mch. Co.

COAL AND COKE.
General Coal Co.

COAL AND ASH HANDLING MACHINERY.
Link-Belt Company.
Louden Machinery Co.

COAL TAR DISINFECTANTS.
(See Disinfectants.)

COCKS.
(See Valves.)

COMB APRONS.
(See Aprons.)

COMBER AND COMBER SUPPLIES.
Foster Machine Co.
Gessner, David
U S Bobbin & Shuttle Co.
Whitin Machine Wks.

COMMISSION MERCHANTS & DEALERS.
(See Cotton Cloth Commission Merchants.)

COMPRESSORS—AIR, GAS, ETC.
Allis-Chalmers Mfg. Co.
Curtis Pneumatic Mchry. Co.
Fulton Supply Co.
General Electric Co.
Hardeman, Isaac.
Gouids Mfg. Co.
Ingersoll-Rand Co.

COMPRESSORS (AMMONIA).
Hardeman, Isaac.

COMPRESSORS (PORTABLE).
Hardeman, Isaac.

COMMUTATOR BRUSHES.
(See Brushes—Motor and Generator.)

CONCRETE REINFORCEMENT.
Birmingham Slag Co.

CONCRETE REINFORCING STEEL.
Ryerson & Son, Inc., Jos. T.

CONDENSERS.
Allis-Chalmers Mfg. Co.
Hardeman, Isaac.

CONDITIONING OVENS—ELECTRIC
Emerson Apparatus Co.

CONDUITS.
(See Elec. Machinery & Supplies.)

CONES (KNITTING YARN).
Foster Mch. Co.
Sonoco Products Co.

CONE WINDING MACHINE.
(See Winding Machinery.)

CONNECTORS—FRANKEL SOLDERLESS.
Westinghouse Elec. & Mfg. Co.

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Ernst & Ernst.

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(See Architects and Engineers)

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Nicola Building Co.
Sirrine & Co., J. E.
Truscon Steel Co.

CONTRACTORS AND ENGINEERS (STEAM).
Mitchell & Co., W. K.

CONTRACTORS—ELECTRICAL.
(See Electrical Engineers.)

CONTRACTORS (PAINTING).
Williams, C. L.

CONTRACTORS (VENTILATING AND HEATING).
Munro & Sons, Hugh F.

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Foxboro Co., Inc.
General Electric Co.
Taylor Instrument Co.

CONVEYORS—BELT.
(See Belt Conveyors.)

CONVEYING MACHINERY.
American Supply Co.
Cresson-Morris Co.
Curtis Pneumatic Mchry. Co.
Ewell-Parker Elec. Co.
Fulton Supply Co.
Hardeman, Isaac.
Link-Belt Co.
Louden Machinery Co.
Mathews Conveyer Co.
Morse Chain Co.
Munro & Sons, Hugh F.
Phila. Drying Machinery Co.
Proctor & Schwartz, Inc.
Saco-Lowell Shops.
Schofield, Wm. Co.

CONVEYORS—PORTABLE.
Link-Belt Co.
Mathews Conveyer Co.

CONVEYORS (ROLLER).
Mathews Conveyer Co.

COOLERS.
(See Humidifying Apparatus.)

COOLERS—WATER.
(See Water Coolers.)

COOLING AND CONDITIONING EQUIPMENT.
American Moistening Co.
Buffalo Forge Co.
Carrier Air Conditioning Co.
Hardeman, Isaac.
Munro & Sons, Hugh F.
Sturtevant Co., B. F.

COOLING TOWERS.
(See Tanks and Towers.)

COPPER STAMPS AND STENCILS.
(See Stamps, Stencils, etc.)

CORDAGE MACHINERY.
Saco-Lowell Shops.
Textile Finishing Machinery Co., The

COPPING MACHINERY (SILK).
Eastwood, Benjamin.

CORPORATION FINANCE (TEXTILE).
American Trust Co.

CORRUGATED SHEET STEEL.
Ryerson & Co., Inc., Jos. T.

COST SYSTEMS.
Ernst & Ernst.

COTTON CLEANING AND AERATING MACHINE.
Murray Company, The.

COTTON FANS.
(See Blowers.)

COTTON YARN AND CLOTH COMMISSION MERCHANTS AND DEALERS.
Aberfoyle Mfg. Co.
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Callaway Mills.
Carver-Beaver Yarn Co., Inc.
Fawcett, Hughes.
Hunter Mfg. & Comm. Co.
Jamieson, J. B.
Lane & Co., J. H.
Meritzer, H. S.
Moss-McDuffe & Co.
Quissett Mill.
Tolar & Hart.
Weimar Bros.
Woodward, Baldwin & Co.

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Montgomery Co., E. W.
Tolar & Hart.

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Atlanta Harness & Reed Mfg. Co.
Barber-Colman Co.
Battle-Ward Sales Co.
Brown Co., David.
Butterworth & Sons, H. W.
Chapman Electric Neutralizer Co.
Crompton & Knowles Loom Works.
Draper Corporation.
Easton & Burnham Mch. Co.
Eclipse Textile Devices, Inc.
Emerson Apparatus Co.
Firsching Co., J. A.
Fletcher Works.
Fales & Jenks Mch. Co.
Foster Machine Co.
Foxboro Co., Inc.
Fulton Supply Co.
Gessner, David
Graton & Knight Mfg. Co.
Harris Co., Geo. W.
Haskins Co., R. G
Holcombe Bunch Builder Co.
Hopedale Mfg. Co.
Howard Bros. Mfg. Co.
Hunt Machine Co., Rodney.
Hyatt Roller Bearing Co.
Jacobs Mfg. Co., E. H.
Lestershire Spool Mfg. Co.
Lowell Crayon Co.
Mossberg Pressed Steel Corp.
Parker Co., Walter L.
Phila. Drying Mchry. Co.
Proctor & Schwartz, Inc.
Root Co.
Roy & Son, R. S.
Sargent's Sons Corp., C. G.
Saco-Lowell Shops.
Schaum & Uhlinger.
Schofield Co., Wm.
Shambow Shuttle Co.
Smith Bobbin Wrks., L. C.
Stafford Co.
Steel Heddle Mfg. Co.
Textile Products Co.
Terrell Machine Co.
Textile Finishing Machinery Co.
Toledo Scale Co.
Tolhurst Mch. Wks.
U S Bobbin & Shuttle Co.
Walker Mfg. Co.
Washburn & Sons, L. R.
Williams Co., J. H.
Whitin Machine Works.
Whitinsville Spinning Ring Co.
Woonsocket Mch. & Press Co.

COTTON TAPE LOOM.
Fletcher Works.
Foster Mch. Co.
Gessner Co., David
Schaum & Uhlinger.

COTTON YARN MILLS.
(See Yarn Manufacturers.)

COUNTERS—REVOLUTION, HANK, PICK, ETC.
Foxboro Co.
Root Co.

COUNTERS—RESTAURANT.
(See Restaurant Equipment.)

COUPLING—SHAFT.
Cresson-Morris Co.
Dodge Mfg. Co.

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Bond Co., Chas.

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(See Hoists.)

CRAYONS.
Lowell Crayon Co.

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CUTS FOR PRINTING.
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(See Cloth Cutters.)

CUTTING APPARATUS (OXY-ACETYLENE & OXY HYDROGEN).
Bird-Potts Co., Inc.
Oxweld Acetylene Co.

CUTTERS—THREAD.
(See Thread Cutters.)

DECARBONIZING APPARATUS
Oxweld Acetylene Co.

DELIVERY CASES.
(See Boxes—Packing.)

DESKS—FACTORY.
Allen Co.

DEXTRINES.
(See Dyestuffs and Chemicals.)

DIAL SCALES.
(See Scales.)

DIES—STEEL.
(See Stamps, Stencils, Etc.)

DIE STOCKS.
(See Pipe Threaders.)

DOBBY CHAINS.
Crompton & Knowles Loom Wks.
Whitin Machine Works.

DIRECTORY (TEXTILE BLUE BOOK).
Comtelburo, Ltd.

DOBBY CARDS.
Jacobs & Co., E. H.

DOFFING BOXES—MILL.
(See Boxes—Mill.)

DOFFER FILLETS.
(See Fillets.)

DOFFING CARS.
(See Cars.)

DRAFT DAMPER REGULATOR
A. W. Cash Co.
Hardeman, Isaac.

DRAWINGS AND ARTWORK.
Jacobs & Co.
Ness, Joseph.

DRAWING FRAMES.
Howard & Bullough.
Saco-Lowell Shops.
Whitin Machine Works.
Woonsocket Mch. & Press Co.

DRILLS—ELECTRIC.
Carter Electric Co.
Fulton Supply Co.
Perry-Mann Elec. Co.
Independent Pneumatic Mchry. Co.
Westinghouse Electric & Mfg. Co.

DRILLS—ROCK.
Ingersoll-Rand Co.

DRINKING FOUNTAINS.
(See Fountains—Drinking.)

DROP WIRES.
Draper Corp.
Mossberg Pressed Steel Corp.
Steel Heddle Mfg. Co.
Williams Co., J. H.

DRYING APPARATUS.
Buffalo Forge Co.
Carrier Air Conditioning Co.
Munro & Sons, Hugh F.
Philadelphia Drying Mchry. Co.
Proctor & Schwartz, Inc.
Sturtevant Co., B. F.

DRYING MACHINERY AND EQUIPMENT.
American Laundry Mchry. Co.
Butterworth, H. W., & Sons Co.
Gessner, David
Munro & Sons, Hugh F.
Philadelphia Drying Mchry. Co.
Proctor & Schwartz, Inc.
Sargent's Sons Corp., C. G.
Textile Finishing Machinery Co., The.
Tolhurst Machine Works.

DUST COLLECTORS.
(See Blowers and Blowing Systems.)

DUSTING MACHINERY.
Proctor & Schwartz, Inc.
Schofield & Sons Wm

DYERS, BLEACHERS AND FINISHERS.
Aberfoyle Mfg. Co.
American Yarn & Processing Co.
Boger & Crawford.
Dixie Mercerizing Co.
Franklin Process Co.
U S Finishing Co.

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American Laundry Mchry. Co
Butterworth & Sons Co., H W.
Electro Bleaching Gas Co.
Emerson Apparatus Co.
Firsching, J. A.
Fletcher Works.
Franklin Process Co.
Fulton Co.
Gessner, David
Hungerford & Terry, Inc.
Hunt Machine Co., Rodney.
Klauder-Weldon Dyeing Mch. Co.
Phila. Drying Machinery Co.
Proctor & Schwartz, Inc.
Reliance Machine Works.
Schaum & Uhlinger.
Textile Finishing Machinery Co., The.
Tolhurst Machine Works.

DYEING MACHINES (PACKAGE AND SPOOL).
Franklin Process Co.

DYE BAGS OR NETS.
Smith Mfg. Co.

DYE STICKS.
Phila. Drying Machinery Co.

DYE VATS AND TUBS.
(See Tanks or Bleaching Kiers.)

DYESTUFFS AND CHEMICALS).
American Diamalt Co.
Arabol Mfg. Co.
Arnold, Hoffman & Co.
Borne, Scrymser Co.
Bosson & Lane.
DuPont de Nemours & Co., E. I.
Ciba Co., Inc.
Electro Bleaching Gas Co.
Fleischmann Co., The.
Ford Co., J. B.
Grasselli Dyestuff Corp.
Houghton & Co., E. F.
Kali Mfg. Co.
Klipstein & Co., A
Lennig & Co., Chas.
Mathieson Alkali Works, Inc.
Metz & Co., H. A.
National Aniline & Chemical Co.
Newport Chemical Wks.
New Brunswick Chemical Co.
Quaker City Chemical Co.
Roessler & Hasslacher Chemical Co.
Penick & Ford Sales Co., Inc.
Rohm & Haas Co.
Sonneborn Sons, Inc., L.
Staley Mfg. Co., A. E.
Stein, Hall & Co.
Sumpas Chemical Co.
United Chemical Products Corp.
Wolf & Co., Jacques.

ELECTRIC CONDUIT AND FITTINGS.
(See Electrical Machinery and Supplies.)

ELECTRIC DYNAMOS AND MOTORS.
(See Motors and Generators.)

ELECTRIC FANS.
(See Fans—Electric.)

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(See Lamps.)

ELECTRIC LAMP GUARDS.
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General Electric Co.
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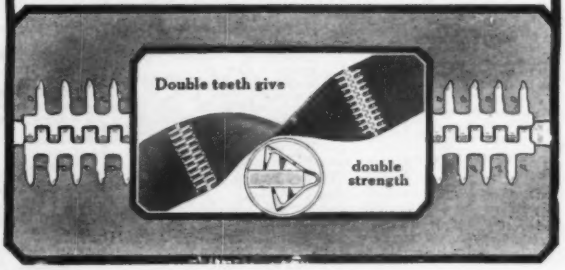

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(See Tractors and Trucks—Electric.)

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ELEVATORS—PORTABLE.
Mathews Conveyer Co.

ELEVATORS.
Link-Belt Company.
Mathews Conveyer Co.

ENAMELED IRON AND GLASS FOR TEXTILE MACHRY.
Mitchell-Bissell Co.

ENAMELMILL WHITE.
(See Paint.)

ENGINEERS—MILL.
(See Architects.)

ENGINES—OIL, GAS AND GASOLINE.
Allis Chalmers Mfg. Co.
Fulton Supply Co.
Hardeman, Isaac.
Ingersoll-Rand Co.

ENGINES (STEAM).
Allis Chalmers Mfg. Co.
American Blower Co.
Fulton Supply Co.
Hardeman, Isaac.
Ingersoll-Rand Co.
Lombard Iron Works & Supply Co.
Toomey, Frank.

ENGINE ROOM APPLIANCES AND SUPPLIES.
Fulton Supply Co.
Jenkins Bros.
Lunkenheimer Co.
Mills & Lupton Supply Co.
Sturtevant Co., B. F.
Westinghouse Elec. & Mfg. Co.

ENGINEERS (CONSULTANT AND EFFICIENCY).
Ernst & Ernst.

ENGINEERS (MECHANICAL).
Bird-Potts & Co., Inc.

ENGRAVINGS AND CUTS.
Jacobs & Co.

ETCHING—PRINTING.
Jacobs & Co.

EXHAUSTERS.
(See Blowers.)

EXPORTERS—COTTON.
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EXTRACTORS—HYDRO.
American Laundry Mchry. Co.
Fletcher Works.
Schaum & Uhlinger.
Tolhurst Machine Works.

FACTORY AND INDUSTRIAL SITES.
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FACTORY MANAGEMENT SYSTEMS.
Ernst & Ernst.

FANS—ELECTRIC.
Buffalo Forge Co.
Carrier Air Conditioning Co.
Carter Electric Co.
General Electric Co.
Hardeman, Isaac.
Munro & Sons, Hugh F.
Perry-Mann Electric Co.
Southern Electric Supply Co.
Sturtevant Co., B. F.
Westinghouse Elec. & Mfg. Co.

FANS—CONVEYING, POWER AND EXHAUST.
(See Blowers and Blowing Systems.)

FASTENERS—BELT.
(See Belt Fasteners.)

FEED WATER PURIFIERS.
(See Boiler Feed Water Purification.)

FEEDERS.
(See Automatic Feeders.)

FELTING MACHINERY.
Proctor & Schwartz, Inc.

FENCESTEEL AND IRON.
Anchor Post Iron Works.
Cyclone Fence Co.

FENCE POSTS—CREOSOTED PINE.
Southern Wood Preserving Co.

FENCE POSTS (STEEL AND IRON).
Anchor Post Iron Works.
Cyclone Fence Co.

FILLETS (CYLINDER DOFFER, BURNISHER AND STRIPPER).
Howard Bros. Mfg. Co.

FILLING—CAP AND WARP.
U S Bobbin & Shuttle Co.

FILM (MOTION PICTURE).
(See Theatre Equipment.)

FILTERS—OIL.
Bowser & Co., Inc., S. F.

FILTERS—WATER.
Hungerford & Terry, Inc.

FILTERS (ALUM).
Lennig & Co., Chas.

FILTER CLOTHS.
Smith Mfg. Co.

FINISHING.
(See Dyers, Bleachers and Finishers.)

FINISHING MACHINERY.
(See Dyeing, Bleaching and Finishing Machry.)

FINISHING, BLEACHING AND SIZING MATERIALS.
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Arabol Mfg. Co.
Arnold, Hoffman & Co.
Borne, Scrymser Co.
Bosson & Lane.
Ciba Co., Inc.
Corn Products Refining Co.
DuPont de Nemours & Co., E. I.
Electro Bleaching Gas Co.
Fleischman Co., The.
Ford Co., J. B.
Houghton & Co., E. F.
Kali Mfg. Co.
Keever Starch Co.
Klipstein & Co., A.
Lennig & Co., Chas.
Mathieson Alkali Works, Inc.
Metz & Co., H. A.
National Aniline & Chemical Co.
Newport Chemical Works.
New Brunswick Chemical Co.
Penick & Ford Sales Co., Inc.
Quaker City Chemical Co.
Roessler & Hasslacher Co.
Rohm & Haas Co.
Seaneborn Sons, Inc., L.
Staley Mfg. Co., A. E.
Stein, Hall & Co.
United Chemical Products Corp.
Warren Soap Mfg. Co.
Wolf & Co., Jacques.

FIRE DOORS AND HARDWARE.
Truscon Steel Co.

FIRE HOSE.
(See Hose—Fire.)

FIRE PROTECTING PAINT.
(See Paint.)

FLAT STEEL HEDDLES.
Steel Heddle Mfg. Co.

FLAX SPINNING.
U S Bobbin & Shuttle Co.

FLEXIBLE COUPLNGS.
Allis-Chalmers Mfg. Co.
Cresson-Morris Co.

FLOOD LIGHTS—ELECTRIC.
Cooper Hewitt Electric Co.
General Electric Co.
Perry-Mann Electric Co.
Southern Electric Supply Co.
Westinghouse Elec. & Mfg. Co.

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Kirkpatrick Lumber & Timber Co.
Southern Cypress Mfg. Assn.
Southern Wood Preserving Co.

FLOORING—WOOD BLOCKS.
Southern Wood Preserving Co.

FLOOR SCRUBBING MACHINE
American Scrubbing Equipment Sales Co.

FLOOR SCRUBBING POWDERS.
(See Scrubbing Powders.)

FLOOR TREATMENTS—CONCRETE AND WOOD.
Truscon Laboratories.

FLOOR SWEEPS.
(See Brushes.)

FLUTED ROLLS.
Howard & Bullough.
Proctor & Schwartz, Inc.
Saco-Lowell Shops.
Southern Spindle & Flyer Co.
Whitin Machine Works.

FLUX (WELDING).
Bird-Potts Co., Inc.
Oxweld Acetylene Co.

FLYERS.
Howard & Bullough.
Saco-Lowell Shops.
Southern Spindle & Flyer Co.
Whitin Machine Works.

FOLDING & TURNING MACHINERY.
Foster Machine Co.

FOUNDERS.
Briggs-Schaffner Co.
Cresson-Morris Co.
Lombard Fdy. & Mch. Wks.

FOUNTAINS—DRINKING.
Bundle-Spence Mfg. Co.

FRICTION CLUTCHES.
(See Clutches—Friction.)

FURNITURE (FOLDING—CAMP).
Smith Mfg. Co.

FURNITURE—MILL.
Smith Mfg. Co.

FUSES—ELECTRIC.
Carter Electric Co.
Fulton Supply Co.
Perry-Mann Electric Co.
Southern Electric Supply Co.

GARNETT MACHINES.
Proctor & Schwartz, Inc.

GAS ENGINES.
(See Engines—Gas.)

GASOLINE .LIGHTING .SYSTEMS, LANTERNS, ETC.
Hardeman, Isaac.
Smith Mfg. Co.

GASOLINE CAMP STOVES.
Smith Mfg. Co.

GATES (FENCE).
(See Fence.)

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Foxboro Co., Inc.
Taylor Instrument Co.

GAUGE—OIL.
Fulton Supply Co.
Lunkenheimer Co.

GAUGES (LIQUID LEVEL).
Foxboro Co., Inc., The.
Lunkenheimer Co.
Taylor Inst. Co.

GAUGES—WATER.
Fulton Supply Co.
Lunkenheimer Co.

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Cresson-Morris Co.
Dodge Mfg. Co.
Fulton Supply Co.
General Electric Co.
Link-Belt Company.
Morse Chain Co.
Piedmont Iron Works

GEAR BLANKS.
Piedmont Iron Works.
Wicaco Screw & Mch. Wks., Inc.

GEAR CUTTING AND CUTTERS.
Cresson-Morris Co.
Piedmont Iron Works.

GEAR PULLERS.
General Electric Co.

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(See Motors and Generators.)

GLOVES (ASBESTOS).
Oxweld Acetylene Co.

GOGGLES (WELDING).
Oxweld Acetylene Co.

GLASSWARE AND DISHES
(See Dishes.)

GOVERNORS—PUMP.
General Electric Co.

GRAPHIC CHARTS.
Ernst & Ernst.

GRAPHITE.
Dixon Crucible Co., Jos.

GRATES—BOILER.
Hardeman, Isaac.
Lombard Fdy. & Mch. Co.
Walsh & Weidner Boiler Co.

GRATES—MECHANICAL.
(See Stokers.)

GREASE.
(See Lubricants.)

GRAVEL.
Montgomery Gravel Co.

GREASE CUPS.
(See Lubricators.)

GRINDER—CARD, CYLINDER ROLL, NAPPER AND GARNET.
(See Card Grinding Machinery.)

GAUGES (WELDING).
Oxweld Acetylene Co.

GUARDS—ELECTRIC LAMP.
(See Electric Lamp Guards.)

GUARDS (MACHINE, SKYLIGHTS, WINDOW, ETC.)
Munro & Sons, Hugh F.

GUIDES—THREAD.
Mitchell-Bissell Co.
Palmer Co., I. E.

GUMS.
(See Finishing and Sizing Materials.)

HACK AND BAND SAWS AND BLADES.
Racine Tool & Mch. Co.

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Jacobs & Co.

HANGERS.
(See Shafting and Hangers.)

HANK CLOCKS.
(See Counters.)

HARNESS—LOOM.
(See Loom Harness.)

HARNESS TWINE.
Harris Co., Geo. W.

HEADS—BOBBIN AND SPOOL.
Lestershire Spool & Bobbin Co.
Parker Co., Walter L.
U S Bobbin & Shuttle Co.

HEATING AND VENTILATING APPARATUS.
(See Ventilating Apparatus.)

HEDDLES.
Crompton & Knowles Loom Works.
Draper Corporation.
Howard Bros. Mfg. Co.
Steel Heddle Mfg. Co.
Walker Mfg. Co.
Williams Co., J. H.

HEDDLE FRAMES.
Crompton & Knowles Loom Works.
Gessner, David
Walker Mfg. Co.
Steel Heddle Mfg. Co.
Williams Co., J. H.

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Curtis Pneumatic Mchry. Co.
Elwell-Parker Electric Co.
Fulton Supply Co.
Link-Belt Company.
Louden Mchry. Co.
Morse Chain Co.

HOPPER FEEDERS.
(See Automatic Feeders.)

HORNS AND MUSICAL INSTRUMENTS.
Conn, Ltd., C. G.

HOSE (WELDING).
Oxweld Acetylene Co.

HOSIERY DYEING MACHINERY.
Franklin Process Co.
Philadelphia Drying Mchry. Co.

HOSIERY FORMS.
(See Drying Forms.)

HOSIERY YARNS.
(See Yarn Manufacturers.)

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Atlanta Biltmore Hotel.
Hotel Lincoln.
Hotel Martinique.
Hotel Sinton.

HUMIDIFYING APPARATUS.
American Moistening Co.
Carrier Air Conditioning Co.
Carrier Eng. Corp.
Hardeman, Isaac.
Munro & Sons, Hugh F.
Parks-Cramer Co.
Sturtevant Co., B. F.

HUMIDIFYING INDICATING INSTRUMENTS.
Foxboro Co., Inc., The.
Taylor Instrument Co.

HUMIDITY RECORDERS.
Foxboro Co., Inc., The.

HYDGRODEIKS.
Tayor Instrument Co.

HYGROMETERS.
Foxboro Co.
Taylor Instrument Co.

HYDRAULIC TURBINES.
(See Turbines—Hydraulic.)

HYDRO EXTRACTORS.
(See Extractors.)

ILLUMINATING ENGINEERS.
Cooper Hewitt Electric Co.
Huntington & Guerry, Inc.

INDICATING AND RECORDING INSTRUMENTS AND THERMOMETERS.
Foxboro Co., Inc.
General Electric Co.
Westinghouse Elec. & Mfg. Co.
Reot Co.
Taylor Instrument Co.

INDIGO.
(See Drestuffs and Chemicals.)

INDUSTRIAL COORDINATION SERVICE.
Sherman Service, Inc.

INDUSTRIAL SITES.
Charlotte Chamber of Commerce
Nashville Industrial Corp.
Port of Charleston.
Southern Ry.
Tennessee Electric Power Co.

INK—STENCIL AND MARKING.
Atlanta Stamp & Stencil Wks
Bradley Mfg. Co., A. J.

IRON AND STEEL.
Ryerson & Son, Inc., Jos. T.

IRON WORK—ORNAMENTAL.
Anchor Post Iron Wks.
Cyclone Fence Co.
Dufur & Co.
Lombard Iron Works & Supply Co.
Piedmont Iron Works

JACK FRAMES.
Woonsocket Mch. & Press Co.

JACK SPOOLS.
(See Spools.)

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JACQUARD HEDDLES.
Steel Heddle Mfg. Co.

JIGS.
Wicaco Screw & Mch. Wks., Inc.

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Dixon Crucible Co., Jos.

JUTE BAGGING MACHINE.
Proctor & Schwartz, Inc.

KETTLES—SIZE.
(See Size Kettles.)

KETTLES—SODA.
Lombard Iron Works & Supply Co.

KIERS.
(See Bleaching Kiers.)

KNIT GOODS.
(See Cotton Cloth Commission Merchants and Dealers.)

KNIT GOODS WASHERS.
(See Washers—Cloth.)

KNITTING MACHINERY AND SUPPLIES.
Brinton Co., H.
Fidelity Machine Co.
Franklin Needle Co.
Granite State Needle Co.
Hemphill Mfg. Co.
Scott & Williams.
Torrington Co.
Standard Trump Bros. Mch. Co.
Wildman Mfg. Co.

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Granite State Needle Co.
Torrington Co.

KNOTTERS.
Barber-Colman Co.

LABORATORY INSTRUMENTS.
Foxboro Co., Inc.
Root Co.
Taylor Instrument Co.

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(See Belt Lacing.)

LAMPS—INCANDESCENT AND ARC.
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General Electric Co.
Perry-Mann Electric Co.
Southern Electric Supply Co.
Westinghouse Elec. & Mfg. Co.

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(See Electric Lamp Guards.)

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Cooper Hewitt Electric Co.
Perry-Mann Electric Co.
Southern Electric Supply Co.
Westinghouse Elec. & Mfg. Co.

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(See Village Architects.)

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Howard Hickory Co.
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Saco-Lowell Shops.
Whitin Machine Works.
Woonsocket Mch. & Press Co.

LATHES.
Fulton Supply Co.

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Smith Mfg. Co.

LAUNDRY MACHINERY AND EQUIPMENT.
American Laundry Mchry. Co.
Fletcher Works.
Gessner, David
Hunt Machine Co., Rodney.
Schaum & Uhlinger.
Tolhurst Machine Works.

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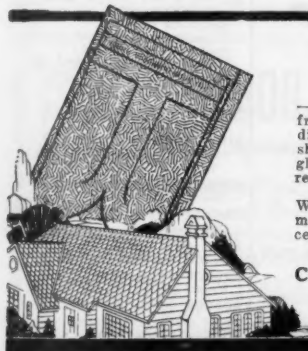

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Graton & Knight Mfg. Co.
Houghton & Co., E. F.
Jacobs Mfg. Co., E. H.
Leather Belting Exchange.
Williams & Sons, I. B.

LIGHTS—FLOOD.
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LIGHTING ENGINEERS AND CONTRACTORS.
(See Illuminating Engineers.)

LINEN YARNS.
(See Yarns—Linen.)

LINK BELTING.
(See Belting—Link.)

LINTERS.
(See Waste Dealers.)

LIQUID CHLORINE.
(See Chlorine.)

LOADERS—WAGON AND TRUCK.
Link-Belt Company.

LOCKERS AND CABINETS.
Allen Company.

LOGWOOD EXTRACT.
(See Dyestuffs and Chemicals.)

LOOMS.
Crompton & Knowles Loom Works.
Draper Corporation.
Fletcher Works.
Gessner, David
Hopedale Mfg. Co.
Saco-Lowell Shops.
Schaum & Uhlinger.
Stafford Co.

LOOM ATTACHMENTS—AUTOMATIC.
Baldwin Picker Rod Lubricator Co., Inc.
Draper Corporation.
Gessner, David
Hopedale Mfg. Co.

LOOM HARNESS.
American Supply Co.
Atlanta Harness & Reed Mfg. Co.
Crompton & Knowles Loom Wks.
Emmons Loom Harness Co.
Garland Mfg. Co.
Harris Co., Geo. W.
Steel Heddle Mfg. Co.
Walker Mfg. Co.

LOOP PICKERS.
Jacobs Mfg. Co., E. H.

LUBRICANTS.
Dixon Crucible Co., Jos.
Houghton & Co., E. F.
N. Y. & N. J. Lubricant Co.

LUBRICATORS.
Baldwin Picker Rod Lubricator Co., Inc.
Bowser & Co., S. F.
Carr Fastener Co.
Lunkenheimer Co.
N. Y. & N. J. Lubricant Co.
Walraven Co.

LUBRICATORS—PICKER ROD—AUTOMATIC.
Baldwin Picker Rod Lubricator Co., Inc.

LUBRICATING SYSTEMS.
Carr Fastener Co.
Walraven Co.

LUG STRAPS.
(See Straps—Lug.)

LUG STICKS.
Allen Co.

LUMBER.
Kirkpatrick Lumber & Timber Co.
Southern Cypress Mfg. Assn.
Southern Wood Preserving Co.

LUNCH ROOM EQUIPMENT.
(See Restaurant.)

MACHINE GUARDS.
(See Guards—Machine.)

MACHINE TOOLS.
(See Tools.)

MACHINISTS
Bird-Potts Co., Inc.
Briggs-Shaffner Co.
Cresson-Morris Co.
Lombard Foundry & Mch. Wks.
Piedmont Iron Works.
Wicaco Screw & Mch. Wks., Inc.

MANIFOLDS.
Orweld Acetylene Co.

MAPLE FLOORING.
Kirkpatrick Lumber & Timber Co.

MARKING POTS, STENCILS, INKS, ETC.
Atlanta Stamp & Stencil Wks.
Bradley Mfg. Co., A. J.

MENDING EYES.
Harris Co., Geo. W.

MERCERIZED YARNS.
(See Yarn Manufacturers.)

MERCERIZERS.
Aberfoyle Mfg. Co.
Amer. Yarn & Processing Co.
Roger & Crawford.
Dixie Mercerizing Co.

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Aberfoyle Mfg. Co.
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Dixie Mercerizing Co.
Hunter Mfg. & Comm. Co.

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Butterworth, H. W. & Sons Co.
Gessner, David
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International Nickel Co.

METAL CEILINGS, ETC.
Truscon Steel Co.

METAL CUTTING MACHINES.
Racine Tool & Mch. Co.

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(See Screens and Sieves.)

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Allis-Chalmers Mfg. Co.
Carter Electric Co.
Foxboro Co., Inc.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

METERS—COUNTING.
(See Counters.)

MILL BASKETS AND BOXES.
(See Boxes—Mill.)

MILL ENGINEER.
(See Architects and Engineers.)

MILL VILLAGES.
(See Villages.)

MILL SUPPLIES—MISCELLANEOUS.
(See Supplies—Mill.)

MILL WHITE PAINT.
(See Paint.)

MOPS.
Atlanta Brush Co.

MOTION PICTURES.
(See Theatre Equipment.)

MOTORS AND GENERATORS—ELECTRIC.
Allis-Chalmers Mfg. Co.
Carter Electric Co.
Fulton Supply Co.
General Electric Co.
Hardeman, Isaac.
Perry-Mann Electric Co.
Southern Electric Supply Co.
Westinghouse Elec. & Mfg. Co.

MOVING PICTURE MCH. AND SUPPLIES.
(See Theatre Equipment.)

MUSICAL INSTRUMENTS.
Conn, Ltd., C. G.

NAPPER ROLL GRINDING MACHINES.
(See Card Grinders.)

NAPPING MACHINERY.
Saco-Lowell Shops.

NAPPER CLOTHING.
Howard Bros. Mfg. Co.

NAPPER SYSTEMS.
Hardeman, Isaac.

NEEDLES—KNITTING.
Franklin Needle Co.
Granite State Needle Co.
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Howard Hickory Co.

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Jacobs & Co.

OFFICE PARTITIONS.
(See Partitions.)

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Johnson & Co., Inc., Oliver.
Houghton & Co., E. F.
N. Y. & N. J. Lubricant Co.
Wadsworth, Howland & Co., Inc.

OIL ENGINES.
(See Engines Oil.)

OILS—FINISHING.
(See Finishing and Sizing Materials.)

OIL CUPS.
(See Lubricants.)

OIL PAPER.
Bradley Mfg. Co., A. J.

OIL PUMPS.
(See Pumps—Oil.)

OIL SEPARATORS.
(See Separators.)

OIL TANKS.
Bowser & Co., Inc., S. F.

OILING DEVICES.
(See Lubricators.)

OPENING MACHINERY—COTTON, WOOL, WASTE, ETC.
Murray Company, The.
Proctor & Schwartz, Inc.
Saco-Lowell Shops.
Schofield Co., Wm.
Whitin Machine Works.
Woonsocket Mch. & Press Co.

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Emerson Apparatus Co.

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Curtis Pneumatic Mchy. Co.
Louden Mchy. Co.

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OXYGEN.
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Jenkins Bros.

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Hookaday Co.
Johnson & Co., Oliver.
Sonneborn Sons, Inc., L.
Toch Brothers.
Truscon Laboratories.
Wadsworth, Howland & Co., Inc.
Warren Co.
Williams, C. L.

PAINT SPRAYING EQUIPMENT.
Wadsworth, Howland & Co., Inc.

PAINTING CONTRACTORS.
(See Contractors.)

PANEL BOARD.
(See Switchboards.)

PAPER.
Bradley Mfg. Co., A. J.

PARTITIONS—STEEL AND WIRE.
Cyclone Fence Co.

PAVING BRICKS.
National Paving Brick Mfg. Assn.

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Roessler & Hasslacher Chemical Co.

PERFORATED METAL.
(See Screens and Sieves.)

PEROXIDES.
Roessler & Hasslacher Chemical Co.

PICK COUNTERS.
(See Counters.)

PICKERS—CURLED HAIR.
Proctor & Schwartz, Inc.
Schofield Co., Wm.

PICKERS—LEATHER.
Bond Co., Chas.
Garland Mfg. Co.
Graton & Knight Mfg. Co.
Houghton & Co., E. F.
Jacobs Mfg. Co., E. H.

PICKER LOOPS.
Jacobs Mfg. Co., E. H.

PICKER BAGS.
Smith Mfg. Co.

PICKER GEARS.
(See Gears.)

PICKER STICKS.
Garland Mfg. Co.

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Schofield Co., Wm.
Whitin Machine Works.
Woonsocket Mch. & Press Co.

PIN BOARDS.
Washburn, Inc.

PINIONS.
General Electric Co.
Piedmont Iron Works.

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Hardeman, Isaac.
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Hardeman, Isaac.
Lunkenheimer Co.
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Hardeman, Isaac.

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Fulton Supply Co.

PIPING—COTTON.
Youngstown Sheet & Tube Co.

PIPE BENDING.
Youngstown Sheet & Tube Co.

PLAYGROUND APPARATUS & EQUIPMENT.
Rundle-Spence Mfg. Co.

PNEUMATIC MACHINERY & TOOLS.
Curtis Pneumatic Mchy. Co.
Independent Pneumatic Tool Co.

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Mitchell-Bissell Co.

POSTS—FENCE (WOOD).
Southern Wood Preserving Co.

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Tennessee Electric Power Co.

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Allis-Chalmers Mfg. Co.
Baldwin Chain & Mfg. Co.
Bond Co., Chas.
Carlyle-Johnson Mch. Co.
Cresson-Morris Co.
Diamond Chain & Mfg. Co.
Dixon Crucible Co., Jos.
Dodge Mfg. Co.
Fafnir Bearing Co.
Flexible Steel Lacing Co.
Fulton Supply Co.
General Electric Co.
Graton & Knight Mfg. Co.
Hyatt Roller Bearing Co.
Leather Belting Exchange.
Link-Belt Company.
Mills & Lupton Supply Co.
Mocassin Bushing Co.
Morse Chain Co.
Piedmont Iron Works.
Reeves Pulley Co.
Rhoads & Sons, J. E.
Skayef Ball Bearing Co.
Strom Ball Bearing Mfg. Co.
Westinghouse Elec. & Mfg. Co.
Wicaco Screw & Mch. Wks., Inc.
Williams & Sons, I. B.

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(See Paints.)

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Logemann Bros. Co.
Phila. Drying Mch. Co.
Proctor & Schwartz, Inc.
Reliance Machine Works.
Textile Finishing Machinery Co., The.

PRESSURE GAUGES.
(See Gauges.)

PRESSURE REGULATORS.
(See Regulators—Pressure.)

PRINTERS (CLOTH).
(See Dyers.)

PRINTING MACHINERY (CLOTH).
Gessner, David

PRINTING.
Jacobs & Co.
Showalter Printing Co., A. J.

PRINTING EXTRACTORS—HYDRO.
Tolhurst Machine Works.

PROPELLER FANS.
(See Blowers.)

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Battle-Ward Sales Co.

PSYCHROMETERS.
Foxboro Co., Inc., The.

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Dodge Mfg. Co.
Fulton Supply Co.
Link-Belt Company.
Reeves Pulley Co.

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Reeves Pulley Co.
Williams & Sons, I. B.

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Allis-Chalmers Mfg. Co.
American Oil Pump & Tank Co.
Fulton Supply Co.
Gould & Eberhardt.
Gould & Eberhardt Mfg. Co.
Hardeman, Isaac.
Ingersoll-Rand Co.
Sydnor Pump & Well Co., Inc.
Tooney, Frank.
Walsh & Weidner Boiler Co., The.
Westinghouse Elec. & Mfg. Co.

PUMPS—OIL.
American Oil Pump & Tank Co.
Bowser & Co., S. F.
Lunkenheimer Co.

PUMP GOVERNORS.
Cash Co., A. W.
Hardeman, Isaac.

PUMP VALVES.
(See Valve Discs.)

PYROMETERS.
Foxboro Co.
Taylor Instrument Co.

QUILLS.
Jordan Mfg. Co.
U S Bobbin & Shuttle Co.

QUILL CLEANING MACHINES.
Terrell Machine Co.

RAILS (STEEL).
Ryerson & Son, Inc., Jos. T.

RAILROADS.
Southern Ry.

RECEIVERS (AIR).
Hardeman, Isaac.

RECEPTACLES—FIBRE.
(See Fibre Products.)

RECOVERING TOP FLATS.
Howard Bros. Mfg. Co.

RECORDING INSTRUMENTS.
Bristol Co.
Foxboro Co., Inc.
General Electric Co.
Taylor Instrument Co.

REEDS AND REED WIRE.
American Supply Co.
Atlanta Harness & Reed Mfg. Co.
Emmons Loom Harness Co.
Steel Heddle Mfg. Co.
Walker Mfg. Co.

REELS.
Allen Company.
Crompton & Knowles Loom Works.
Draper Corporation.
Easton & Burnham Mch. Co.
Hunt Machine Co., Rodney.
Mossberg Pressed Steel Co.
Saco-Lowell Shops.
Schofield Co., Wm.
Whitin Machine Works.

REFLECTORS—LAMPS.
(See Lamp Reflectors.)

REGULATORS—LIQUID LEVEL.
Foxboro Co., Inc.
Fulton Co.
General Electric Co.

REGULATORS (COMPRESSED GAS).
Orweld Acetylene Co.

REGULATORS (BOILER FEED)
(See Boiler Feed Regulators.)

REGULATORS (DRAFT).
(See Draft Regulators.)

REGULATORS—PRESSURE.
Cash Co., A. W.
Foxboro Co., Inc., The.
Fulton Co.
General Electric Co.
Hardeman, Isaac.
Taylor Instrument Co.

REGULATORS—TEMPERATURE.
(See Temperature Controllers.)

REINFORCING SLAG.
Birmingham Slag Co.

REPAIRING—ELECTRICAL.
Briggs Shaffner Co.
Huntington & Guerry, Inc.
Southern Electrical Supply Co.
Westinghouse Elec. & Mfg. Co.

REPAIRING—TEXTILE MACHINERY, ETC.
Bird-Potts Co., Inc.
Briggs-Shaffner Co.
Piedmont Iron Works.
Southern Spindle & Flyer Co.

RIBBERS.
(See Knitting Machinery.)

RIB TOP CUTTERS.
Wildman Mfg. Co.

RINGS—PISTON
Wicaco Screw & Mch. Wks., Inc.

RINGS—SPINNING.
(See Spinning Rings.)

ROCKER SHAFT BEARINGS.
(See Bearings.)

RODS (WELDING).
Orweld Acetylene Co.

ROLLER BEARINGS.
Hyatt Roller Bearing Co.

ROLLER CLOTH.
(See Cloth.)

ROLLER CONVEYORS.
Mathews Conveyor Co.

ROLLER LEATHER.
Bond & Co., Chas.
Houghton & Co., E. F.

R.I.W.
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Every Description

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Manufacturer of Brushes
ANDOVER, MASS.

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Butterworth & Sons Co., H. W.
Textile Finishing Mchy. Co.
U S Bobbin & Shuttle Co.
Washburn, Inc.

ROLLS—RUBBER COVERED.
Butterworth & Sons Co., H. W.
Textile Finishing Mchy. Co.
Stowe & Woodward Co.

ROLLS—STEEL.
Butterworth & Sons Co., H. W.
Southern Spindle & Flyer Co.
Textile Finishing Mchy. Co.
U S Bobbin & Shuttle Co.
Washburn, Inc.

ROLLS (WOODEN).
U S Bobbin & Shuttle Co.
Washburn, Inc.

ROOFING.
Cortright Metal Roofing Co.
Kirkpatrick Lumber & Timber Co.
Richardson Co.
Southern Wood Preserving Co.
Wadsworth, Howland & Co.

ROOFERS.
Kirkpatrick Lumber & Timber Co.

ROOFING AUXILIARIES (PIPE GUTTERS—EAVE TROUGH ETC.)
Kirkpatrick Lumber & Timber Co.

ROOF AND CEMENT COATING.
American Cement Paint Co.
Hockaday Co.
Johnson & Co., Inc., Oliver.
Sonneborn Sons, Inc., L.
Tech Brothers.
Truscon Laboratories.
Wadsworth, Howland & Co.

ROPE—TRANSMISSION.
Allis-Chalmers Mfg. Co.
Cresson-Morris Co.
Link-Belt Company.

ROVING CANS.
(See Cans—Roving.)

ROVING FRAMES AND MACHINERY.
Gessner, David
Howard & Bullough.
Saco-Lowell Shops.
Whitin Machine Works.
Woonsocket Mch. & Press Co.

RUBBER COVERED ROLLS.
Stowe & Woodward Co.

RUBBER SPECIALTIES (TEXTILE MILLS).
Stowe & Woodward Co.

RUBBER STAMPS.
(See Stamps, Stencils, Etc.)

RUST PROOFING COMPOUND.
Tech Brothers.

SALTS.
(See Finishing & Sizing Materials.)

SANITARY PRODUCTS.
Bundle-Spence Mfg. Co.
Vogel Co., Jos. A.

SANITARY ENGINEERS, CONTRACTORS & BUILDERS.
(See Engineers—Sanitary.)

SASH-WINDOW—STEEL.
(See Window Sash.)

SAWING MACHINES AND SAW BLADES.
Racine Tool & Mch. Co.

SAXOPHONES, ETC.
(See Musical Instruments.)

SCALES.
Toledo Scale Co.

SCALE PREVENTER—BOILER.
(See Boiler Feed Water Purification.)

SCREENS AND SIEVES—PERFORATED.
Allis-Chalmers Mfg. Co.
Ardis Perforating Co.
Link Belt Company.

SCREWS.
Wicaco Screw & Mch. Wks., Inc.

SCOURING MACHINERY.
(See Washers—Cloth.)

SCRUBBING MACHINE—FLOOR.
American Scrubbing Equip. Co.
Vail & Co., D. H.

SCRUBBING AND WASHING POWDERS.
Mathieson Alkali Works.
Warren Soap Mfg. Co.

SCUTCHERS.
Whitin Mch. Wks.

SECOND HAND MACHINERY AND SUPPLIES.
Battle-Ward Sales Co.
Nashville Industrial Corp.
Toomey, Frank, Inc.

SECTION BEAMS.
(See Beams.)

SELVAGE HARNESS.
(See Harness.)

SEWING MACHINES.
Merrow Machine Co., The.
Textile Finishing Mchy. Co.

SHADES—ELECTRIC LAMP.
(See Reflectors.)

SHAFTING AND HANGERS.
Allis-Chalmers Mfg. Co.
Cresson-Morris Co.
Dodge Mfg. Co.
Fafnir Bearing Co.
Fulton Supply Co.
Hyatt Roller Bearing Co.
Link-Belt Company.
Skayef Ball Bearing Co.

SHEET STEEL (PLAIN AND GALVANIZED).
Hardeman, Isaac.
Ryerson & Son, Inc., Jos. T.

SHELVING—SECTIONAL STEEL.
Hyatt Roller Bearing Co.

SHINGLES (METAL).
Cortright Metal Roofing Co.

SHINGLES—WOOD.
Kirkpatrick Lumber & Timber Co.
Southern Cypress Mfg. Asso.
Southern Wood Preserving Co.

SHIPPING ROOM MACHINERY AND SUPPLIES.
Atlanta Stamp & Stencil Wks.
Bradley Mfg. Co., A. J.
Smith Mfg. Co.
Toledo Scale Co.

SHUTTLES.
Brown Co., David.
Crompton & Knowles Loom Works.
Draper Corporation.
Jordan Mfg. Co.
Shambow Shuttle Co.
U S Bobbin & Shuttle Co.
Williams Co., J. H.

SILK MACHINERY
Eastwood, Benjamin.

SILK YARNS.
Judson Mills.
Meritzer, H. S.
Tubize Artificial Silk Co. of America.

SINGEING MACHINERY.
Butterworth & Sons Co., H. W.
Phila. Drying Machine Co.
Textile Finishing Machinery Co., The.

SITES FOR FACTORIES.
(See Industrial Sites.)

SIZE BOX TEMPERATURE CONTROLLER.
Ferbere Co., Inc., The.
Fulton Co.

SIZE KETTLES AND TANKS.
(See Bleaching Kiers or Tanks.)

SIZING AND FINISHING COMPOUNDS.
(See Finishing and Sizing Materials.)

SKEWERS.
Jordan Mfg. Co.

SLAG FOR CONCRETE.
Birmingham Slag Co.

SLASHERS AND SLASHER ROOM SUPPLIES.
Butterworth & Sons Co., H. W.
Easton & Burnham Mch. Co.
Gessner, David
Howard & Bullough.
Mossberg Pressed Steel Corp.
Saco-Lowell Shops.
Textile Finishing Machinery Co., The.

SLASHER CLOTH.
(See Cloth.)

SLASHER FANS.
Hardeman, Isaac.

SLASHER TAPE.
(See Tape—Slasher.)

SLATE ASPHALT ROOFING.
Barrett Co.

SLUBBERS.
Howard & Bullough.
Saco-Lowell Shops.
Whitin Machine Works.
Woonsocket Mch. & Press Co.

SMOKE STACKS.
Hardeman, Isaac.
Walsh & Weidner Boiler Co.

SOAPS—TEXTILE.
American Diamalt Co.
Arabol Mfg. Co.
Arnold, Hoffman & Co.
Borne, Scrymser Co.
Ciba Co., Inc.
Fleischmann Co., The.
Kali Mfg. Co.
Klipstein & Co., A.
Lennig & Co., Chas.
Mathieson Alkali Works, Inc.
Newport Chemical Wks.
Rohm & Haas Co.
Sonneborn Sons, Inc., L.
Stein, Hall & Co.
United Chemical Products Corp.
Warren Soap Mfg. Co.
Wolf & Co., Jacques.

SOFTENERS—COTTON.
(See Finishing & Sizing Materials.)

SOFTENERS—WATER.
(See Water Softeners.)

SOLDERLESS CONNECTORS—FRANKEL.
Westinghouse Elec. & Mfg. Co.

SOLOZONE.
Roessler & Hasslacher Chem. Co.

SOLVENTS.
(See Finishing.)

SPEEDERS.
Jordan Mfg. Co.
Parker & Co., Walter L.
U S Bobbin & Shuttle Co.

SPEED VARYING TRANSMISSION.
Reeves Pulley Co.

SPEEDOMETERS.
(See Counters.)

SPINDLES AND FLYERS.
Easton & Burnham Mch. Co.
Draper Corporation.
Saco-Lowell Shops.
Southern Spindle & Flyer Co.
Whitin Machine Works.
Wicaco Screw & Mch. Wks., Inc.
Woonsocket Mch. & Press Co.

SPINNERS.
(See Yarn Manufacturers.)

SPINNING FRAMES.
American Machine Co., H. & B.
Crompton & Knowles Loom Works.
Fales & Jenks Mch. Co.
Gessner, David
Howard & Bullough.
Saco-Lowell Shops.
Schaum & Uhlinger.
Whitin Machine Works.

SPINNING RINGS.
Draper Corporation.
Fulton Supply Co.
Howard & Bullough.
Saco-Lowell Shops.
Whitin Machine Works.
Whitinsville Spinning Ring Co.

SPINNING TAPE SPECIALISTS.
American Textile Banding Co., Inc.
Barber Mfg. Co.

SPOOLING MACHINERY AND SUPPLIES.
Barber-Colman Co.
Draper Corporation.
Easton & Burnham Mch. Co.
Foster Mch. Co.
Gessner, David
Proctor & Schwartz, Inc.
Saco-Lowell Shops.
Whitin Machine Works.

SPOOLS AND SKEWERS.
Allen Co.
Brown Co., David.
Fulton Supply Co.
Jordan Mfg. Co.
Lestershire Spool & Mfg. Co.
Mossberg Pressed Steel Corp.
Parker Co., Walter L.
Steel Heddle Mfg. Co.
Smith Bobbin Wks., L. C.
Textile Products Co.
U S Bobbin & Shuttle Co.

SPRAYING DEVICE FOR PAINTING.
(See Paint Spray.)

SPRINKLER TANKS.
(See Tanks, Towers, Etc.)

SPROCKETS.
Baldwin Chain & Mfg. Co.
Hardeman, Isaac.
Link-Belt Company.
Morse Chain Co.

STACKS—RADIAL BRICK.
Hardeman, Isaac.

STAIR STEP TREADS (ANTI-SLIP).
American Abrasive Metals Co.

STAMPS, STENCILS AND STENCIL MACHINES.
Atlanta Stamp & Stencil Wks.
Bradley Mfg. Co., A. J.
Dixie Seal & Stamp Co.

STAND PIPES.
(See Tanks.)

STARCH AND GUMS.
American Diamalt Co.
Arnold, Hoffman & Co.
Borne, Scrymser Co.
Bosson & Lane.
Ciba Co.
Corn Products Refining Co
Fleischmann Co., The.
Kali Mfg. Co.
Klipstein & Co., A.
Keever Starch Co.
Mathieson Alkali Works, Inc.
Metz Co., H. A.
Newport Chemical Wks.
Penick & Ford Sales Co., Inc.
Sonneborn Sons, Inc., L.
Staley Co., A. E.
Stein, Hall & Co.
Warren Soap Mfg. Co.

STEAM ENGINES.
(See Engines—Steam.)

STEAM POWER PIPING.
Hardeman, Isaac.

STEAM PUMPS.
(See Pumps—Steam.)

STEAM SEPARATORS.
(See Separators.)

STEAM TRAPS.
(See Traps—Steam.)

STEEL (BARS, SHAPES, PLATES, SHEETS, ETC.)
Ryerson & Son, Inc., Jos. T.

STEEL BUILDINGS.
Truscon Steel Co.

STEEL SASH.
(See Window Sash.)

STEEL SHELVING, DOORS, WINDOWS, PARTITIONS, ETC.
Truscon Steel Co.

STENCILS AND STENCIL PAPERS.
(See Stamps and Stencils.)

STENCIL BRUSHES.
(See Marking Pots and Brushes.)

STENCIL CUTTING MACHINES.
Atlanta Stamp & Stencil Wks.
Bradley Mfg. Co., A. J.

STICKS—PICKER.
(See Picker Sticks.)

STOOLS.
(See Furniture—Mill.)

STOP MOTION.
Crompton & Knowles Loom Works.
Draper Corporation.
Eclipse Textile Devices, Inc.
Whitin Machine Works.
Wildman Mfg. Co.

STOKERS.
Hardeman, Isaac.
Westinghouse Elec. & Mfg. Co.

STORAGE RACKS.
(See Shelving.)

STORAGE TANKS.
(See Tanks.)

STRAPS (LUG, CHECK, HEEL, TUGGER, PICKER, HARNESS, ETC.)
Atlanta Harness & Reed Co.
Bond Co., Chas.
Fulton Supply Co.
Garland Mfg. Co.
Graton & Knight Mfg. Co.
Houghton & Co., E. F.
Jacobs Mfg. Co., B. H.

STRAPPING.
(See Leather Specialties or Check Straps.)

STREET LIGHTING FIXTURES
General Elec. Co.
Huntington & Guerry, Inc.
Westinghouse Elec. & Mfg. Co.

STRAINERS (PUMP SUCTION)
Cash Co., A. W.
Hardeman, Isaac.

STRICKLES.
Howard Bros. Mfg. Co.

SULPHIDES.
(See Finishing & Sizing Materials.)

SUPPLIES—GENERAL MILL.
Dodge Mfg. Co.
Fulton Supply Co.
Graton & Knight Mfg. Co.
Jenkins Bros.
Link-Belt Co.
Lunkenheimer Co.
Mills & Lupton Supply Co.
Morse Chain Company.
Rheads & Sons, J. H.
Williams & Sons, I. B.

SUPPLIES (OFFICE).
(See Office Equipment.)

SWEEPS.
(See Brushes.)

SWINGS (PLAYGROUND).
(See Playground Equipment.)

SWITCHES—KNIFE-ELECTRIC.
Fulton Supply Co.
General Electric Co.
Westinghouse Electric & Mfg. Co.

SWITCHBOARDS—PANEL.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

SYSTEMS (BUSINESS).
Ernst & Ernst.

TABLES (METAL).
(See Furniture.)

TACHOMETERS (RECORDING AND INDICATING).
Foxboro Co., Inc., The.
Root Co.

TALLOW.
(See Finishing Materials.)

TANKS (ELEVATED).
Lombard Iron Works.
Walsh & Weidner Boiler Co.

TANKS—OIL.
Bowser & Co., Inc., S. F.

TANKS (SPRINKLER).
Lombard Iron Works.

TANKS (STEEL STORAGE).
American Oil Pump & Tank Co.
Lombard Iron Works.
Walsh & Weidner Boiler Co.

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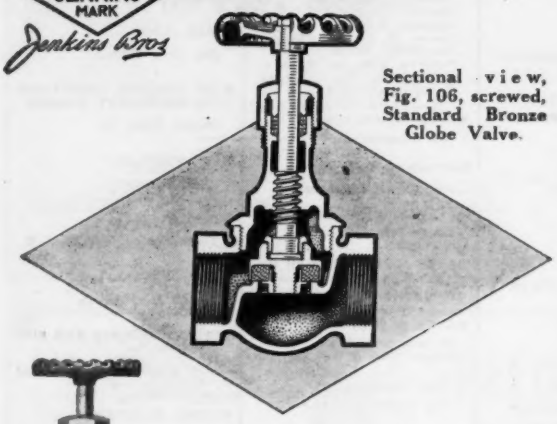

Sectional view, Fig. 106, screwed, Standard Bronze Globe Valve.

Fig. 108, screwed, Standard Bronze Angle Valve

Fig. 370, screwed, Standard Bronze Gate Valve, stationary spindle inside screw.

Fig. 141, screwed, Standard Iron Body Globe Valve, with yoke.

A valve so marked, you can count on

From time immemorial the maker of quality merchandise has taken a pardonable pride in his handiwork. Almost without exception, he has identified his product by a mark or symbol, or in some other way, primarily to make it instantly recognizable for the benefit and assurance of the buyer who would have no other.

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The Jenkins Diamond has now for sixty years been synonymous with genuine valve service. And the inflexible policy of Jenkins Bros. will ever be to uphold, and, if possible, to strengthen the reputation.

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SINCE 1864

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We carry extensive stocks and a wire to us at our expense brings service that is swift and sure. Write or wire for prices.

BARBER MFG. CO.
Lowell, Mass.
Spinning Tape Specialists

BARBER
Spinning & Twisting
TAPES

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TANKS (WOODEN).
Philadelphia Drying Mchry. Co.
Proctor & Schwartz, Inc.
Textile Finishing Mchry. Co.

TAPE LOOMS—COTTON.
Gessner, David
Fletcher Works.
Schaum & Uhlinger.

TAPES AND BRAIDS.
American Textile Banding Co., Inc.
Barber Mfg. Co.
Weimar Brothers.

TAPES—SPINNING AND TWISTING.
Barber Mfg. Co.

TAPE MAKING MACHINES.
(See Bandage and Tape Machinery.)

TAPIOCA FLOUR.
Stein, Hall & Co

TARPAULINS.
Smith Mfg. Co.

TAX SERVICE.
Ernst & Ernst.

TELEPHONE—CALLING SYSTEM.
Carter Electric Co.
General Electric Co.

TEMPERATURE CONTROLLERS AND REGULATORS.
Carrier Eng. Corp.
Foxboro Co., Inc., The
Fulton Co.
Hardeman, Isaac.
Parks-Cramer Co.
Taylor Instrument Co.

TEMPLES.
Draper Corporation.

TENSION—SPOOLER.
Eclipse Textile Devices, Inc.
Foster Mch. Co.

TENTS (ALL KINDS).
Smith Mfg. Co.

TENTERS.
Butterworth & Sons Co., The.
Textile Finishing Mach. Co.

TENTER HOUSING & RECONSTRUCTING SYSTEM.
Munro & Sons, Hugh F.
Proctor & Schwartz, Inc.

TEXTILE BLUE BOOK DIRECTORY.
Cantelboro, Ltd.

TEXTILE MACHINERY.
(See Cotton Mill Machinery.)

THERMOMETER—ANGLE AND STRAIGHT STEM.
Foxboro Co., Inc., The.
Taylor Instrument Co.

THERMOMETERS—RECORDING AND INDEX.
Foxboro Co.
Taylor Instrument Co.

THERMOSTATS.
Foxboro Co.
Fulton Co.
Taylor Instrument Co.

THIN PLACE PREVENTERS.
Draper Corporation.

THREAD EXTRACTORS.
Woonsocket Mch. & Press Co.

THREAD GUIDES.
Mitchell-Bissell Co.
Palmer Co., The I. B.

TILE ROOFING.
Richardson Co.

TIMBER.
(See Lumber.)

TIME CLOCKS.
(See Clocks.)

TIES—BALING.
(See Bale Ties.)

TIRE FABRIC EQUIPMENT.
Fletcher Works.

TOILETS.
Bundle-Spence Mfg. Co.
Vogel Co., Jos. A.

TOOLS (MACHINE—HAND & ELECTRIC).
Fulton Supply Co.
Independent Pneumatic Tool Co.
Ryerson & Son, Inc., Jos. T.

TOP FLATS RECOVERED.
Howard Bros. Mfg. Co.

TORCHES (BRAZING, CUTTING AND WELDING).
Bird-Potts Co., Inc.
Oxweld Acetylene Co.

TOWERS.
(See Tanks—Elevated.)

TRACTORS (ELECTRIC).
Elwell-Parker Electric Co.

TRADEMARKING EQUUIPMENT.
Continental Trademark Co., Inc.
Kaumagraph Co.

TRANSFERS FOR TRADEMARKING.
Continental Trademark Co., Inc.
Kaumagraph Co.

TRANSMISSION—POWER.
(See Power Transmission Machinery.)

TRAPS—RETURN STEAM.
Hardeman, Isaac.
Morehead Mfg. Co.

TRAVELERS—CONVEYOR.
Curtis Pneumatic Mchry. Co.
Louden Mchry. Co.
Mathews Conveyor Co.

TREES & SHRUBBERY.
Howard Hickory Co.

TRIPTODS.
U S Bobbin & Shuttle Co.

TROLLEYS & HOISTS.
Curtis Pneumatic Mchry. Co.
Elwell-Parker Electric Co.
Louden Mchry. Co.
Ryerson & Son, Inc., Jos. T.

TRUCKS—AUTO.
White Co.

TRUCKS, BASKETS, ETC.
Allen Co.
Hasking Co., R. G.
Smith Mfg. Co.
Washburn, Inc.

TRUCKS (BEAM).
Allen Company.

TRUCKS (ELECTRIC).
Elwell-Parker Electric Co.

TRUCKS (HAND & POWER)—INTER. ETC.
Allen Company.
Elwell-Parker Electric Co.

TRUCKS (WELDERS).
Oxweld Acetylene Co.

TUBES AND CONES.
Sonoco Products Co.

TUBS.
(See Tanks—Wooden.)

TUBING—METAL.
Youngstown Sheet & Tube Co.

TURBINES—HYDRAULIC.
Allis-Chalmers Mfg. Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

TURBINES—STEAM.
Allis-Chalmers Mfg. Co.
American Blower Co.
General Electric Co.
Hardeman, Isaac.
Sturtevant Co., B. F.
Westinghouse Elec. & Mfg. Co.

TURBO UNDERGRATE BLOWERS.
American Moistening Co.
Carrier Air Conditioning Co.

TWISTING MACHINERY AND SUPPLIES.
Barber Mfg. Co.
Draper Corporation
Fales & Jenks Mch. Co.
Foster Mch. Co.
Gessner, David
Howard & Bullough.
Proctor & Schwartz, Inc.
Saco-Lowell Shops.
U S Bobbin & Shuttle Co.
Whitin Machine Works.

UNIONS—BRONZE.
Fulton Supply Co.
Jenkins Bros.
Lunkenheimer Co.

URINALS.
Bundle-Spence Mfg. Co.
Vogel Co., Jos. A.

VACUUM CLEANERS.
Hardeman, Isaac.

VACUUM GAUGES.
(See Gauges.)

VACUUM PANS.
Crosse-Morris Co.

VALVES—ANGLE, GLOBE, CROSS, BLOW-OFF, CHECK, GATE, POP-SAFETY, ETC.
Fulton Supply Co.
Jenkins Bros.
Lunkenheimer Co.

VALVES (BACK PRESSURE).
Jenkins Bros.
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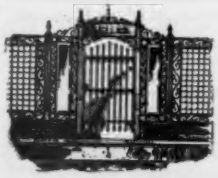

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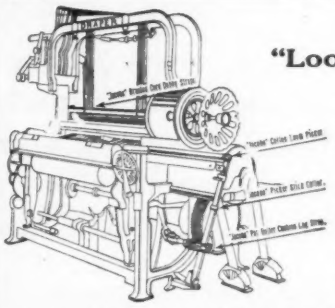

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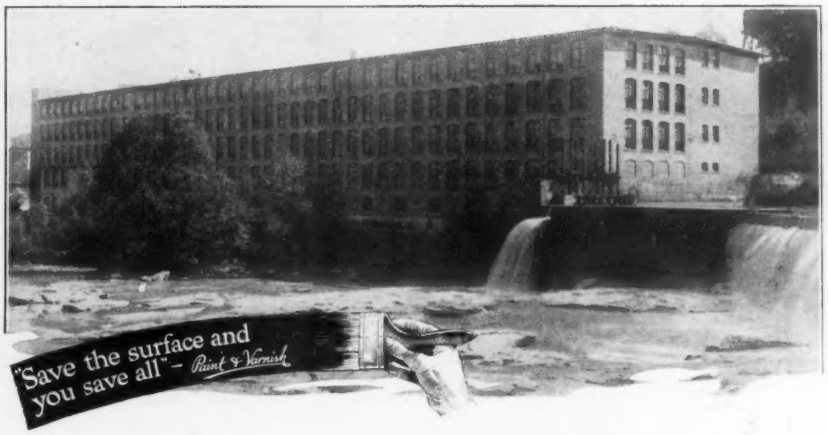

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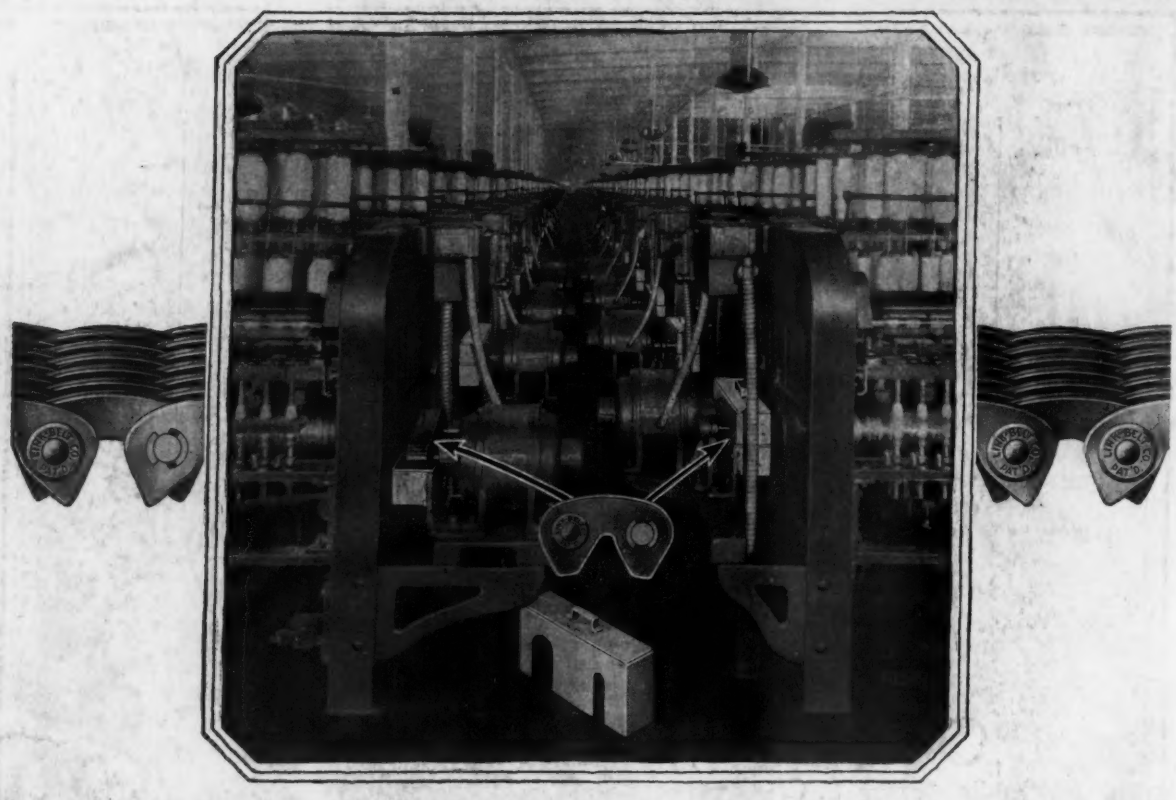

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"SINCE we made our Link-Belt Silent Chain installations on 100 five-H. P. and 92 ten-H. P. motors, during 1918 and 1919, most of these have been operating day and night. The same is true of many of the older drives, on our 10-H. P. motors. In this time we have been out only one 10-H. P. chain and two 5-H. P. chains. But even here we have made use of these three chains for repairing our oldest ones when repairs are needed. A fine record."

Our 144 page Price List Data Book No. 125 on request.

JUL-01938

1923

LINK-BELT COMPANY

PHILADELPHIA, 2045 Hunting Park Ave. CHICAGO, 300 W. Pershing Road INDIANAPOLIS, P. O. Box 85

Boston - - - - - - - - 49 Federal St. Charlotte. N C. - - J. S. Cothran, 909 Commercial Bank Bldg.

Birmingham, Ala. - - - - 720 Brown-Marx Bldg. Atlanta - - - - - - - - - 24 Marietta St.

LINK-BELT
SILENT CHAIN DRIVES